

41 d 10  
OBSERVATIONS

ON

DISEASES

INCIDENTAL TO

SEAMEN.

By LEWIS ROUPPE, M.D. K

TRANSLATED FROM THE

LATIN EDITION Printed at LEYDEN.

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M DCC LXXII.

# OBSERVATION

OF THE  
MAGNETIC

AND ELECTRIC

MATERIALS

IN MAGNETISM

BY PIERRE JONQUIÈRE MD

PARIS  
EDITION DE L'ACADEMIE  
DE PARIS  
PARIS  
1812



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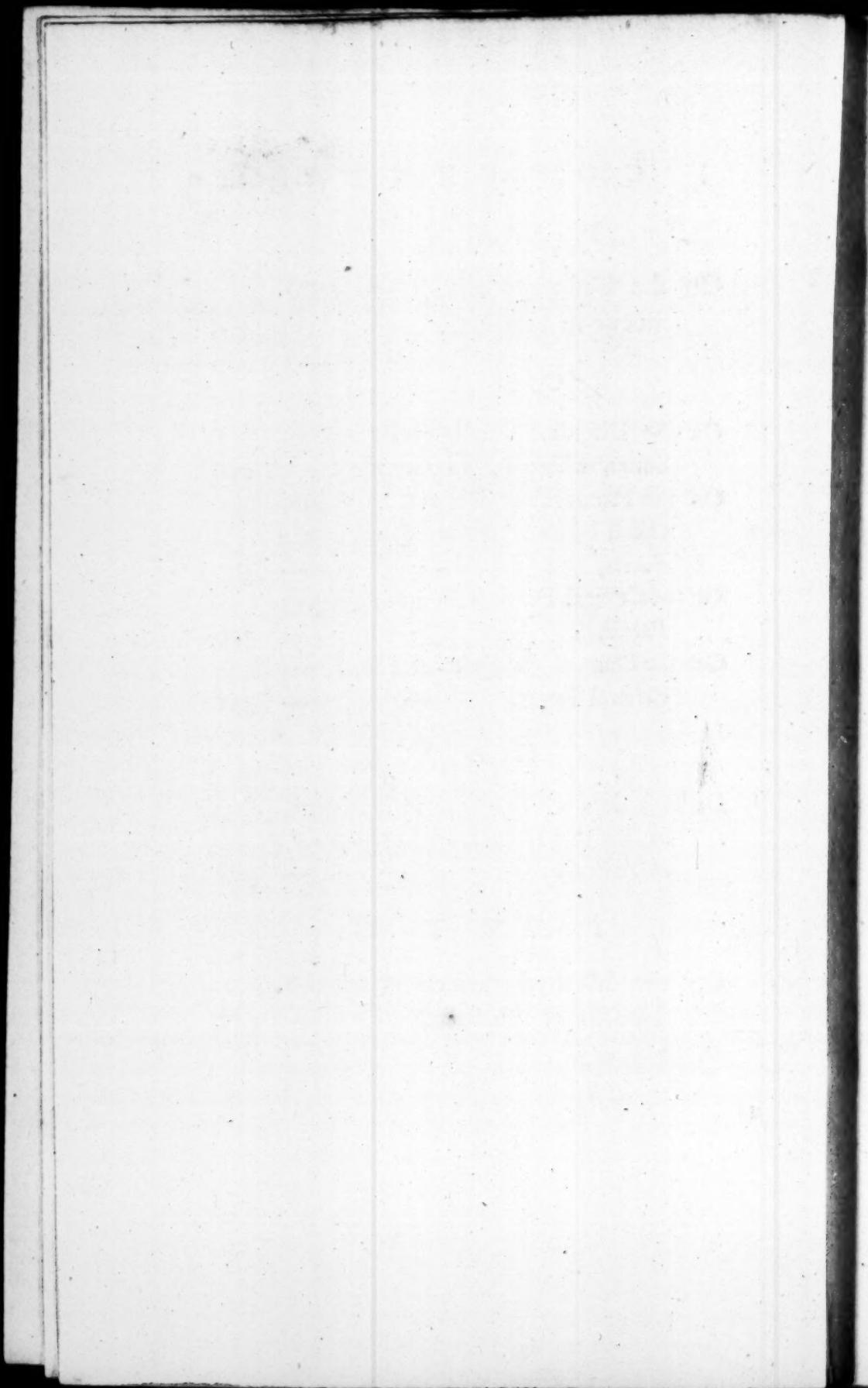
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A



T H E  
TRANSLATOR's PREFACE.

**D**R. ROUPPE, the learned Author of this elaborate Dissertation, practised both Physick and Surgery many years in the French Army, and after that in the Dutch Navy, during which time he had every opportunity necessary to observe and examine the diseases most common among the Soldiers and the Seamen.

Being desirous of taking a Doctor's degree in the University of Leyden, he chose for the subject of his inaugural Thefis, the diseases incidental to Seamen ; but having since that a little more leisure on his hands, he revised his Thesis, and greatly enlarged his Plan, and brought it to that degree of perfection, in which it was published in Latin, at Leyden, in the year 1764, and is now translated for the use of the English reader.

The great accuracy observed by our ingenious Author, in his descriptions of diseases, and of every particular symptom belonging to them, as well as the candour with which he relates the success of his practice, must be of infinite service to every practitioner, and especially to those who practice on board of ship ; while we cannot sufficiently admire and commend the unwearied pains he has taken, by repeated dissections, to investigate the true causes and nature of these disorders ; dissections, which must have been attended with the greatest difficulties, on account, not only of the many inconveniences for that kind of business on ship board, and the opposition he must frequently have met with, from the superstition and obstinacy of the sailors, which is always greatest in proportion to their ignorance, but likewise of the danger of catching the infection, which from bodies in such a highly putrid state, as many of them were in, pent up in a confined place, and that generally in the hottest climates, must have been amazingly great ; so that none but a truly philosophical

ii TRANSLATOR'S PREFACE.

sophical mind could have possibly thought of exposing himself to such repeated hazards.

Disagreeable and inconvenient however as dissections in general may be, yet the benefits which the art of healing must inevitably receive from them, are so great, that it is hoped, that Dr. Rouppe's example will be followed by all practitioners, and in particular, that the sea surgeons will neglect no opportunity of opening as many bodies as they can conveniently, since it is by such means that many, and the most valuable discoveries have been made in phyzick, and that the marine practice it must be owned is still, as may be said, in a state of infancy.

With regard to this Translation, all that can be said of it is, that it is a literally true one, the Translator thinking it his duty to deliver the author's sentiments whole and entire, without the least deviation or alteration, and as nearly as possible in his own words and manner, in order that the reader should be satisfied, that nothing is presented to him but the Author's genuine Work; and however prolix, or too minute he may be thought in some of his divisions, yet the Translator hopes he will be forgiven, if he has neither abridged or altered them in any shape; to some people it may be agreeable to see what kind of management is observed on board the Dutch Men of War, and to others, it may possibly serve to gratify their own good opinion.

P R E.

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ii P R E F A C E.

the number of men is much too great for the space in which they must be contained, through the fatigues to which they are continually exposed, the necessity of keeping watch, and the want sometimes of good provisions, we may readily suppose these disorders to be unavoidable. These then are what at present I propose to make the subject of my enquiry. But perhaps my labours may be deemed useless and unnecessary by some, when it is remembered, how many excellent writers have appeared on the subject of the disorders incident to seamen. Yet I do not think, altogether, on many accounts, that I shall be employed in a manner unserviceable to the publick, in giving a detail of the observations which I have had an opportunity of making in some voyages which I have made. Some of those writers never had the advantage of visiting the sick whilst confined to their hammocks, nor were they acquainted with their manner of living when in health; from whence it arises, that some of the conclusions

conclusions which they have drawn, are by no means valid. If we were to consult some of the English writers on the subject, and visit the sick at the same time, we would most assuredly find a material difference between the disorders on board Dutch ships, and their accounts of them. I shall therefore confine myself to the consideration of those disorders and their causes, to which sailors and soldiers on board Dutch men of war are particularly liable. And in order to set this matter in a clearer light, I shall first mention some few circumstances relating to matters on board of ship. And first, with respect to the ship's crew, which is composed either of young hearty seamen, or in a great measure of old worn out men, very inactive, and generally troubled with some bodily disorder. The greater number there are of the latter, the more unhealthy the crew is in general. For they contract disorders much sooner than the others on board, and do more harm than good in the ship. They can-

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not be of any service, as being utterly unable to work, but they are of great disservice, as by being sick they take up more room, and thus not only prevent those who are well from having a place large enough to hang their hammocks, but likewise, by their groans and complaints, deprive them of their natural rest; but, besides all this, which is still worse, they impregnate the air they breathe with such noxious exhalations, as are of the most prejudicial consequences to those who are well. So that if there are twenty sick in the ship from any common cause, the number is soon doubled or trebled, and the rest of the men alarmed by the sickness of their comrades, are soon put in danger of their lives. It may likewise be remarked, that the greater the number of men is on board, the more inconveniently they must necessarily be placed, and of consequence the air must be the more confined and unwholesome. But if, as it often happens, the ship has its proper complement, and is obliged over  
and

## P R E F A C E. \*

and above to carry soldiers for any expedition, and to keep them long on board, the crew may then be said to be in a very bad situation. For the soldiers, exclusively of their total ignorance in navigating a ship, are generally very lazy, and pay but little regard to cleanliness, which is a very material circumstance on board of ship.

It is likewise of some consequence to know, of what kind of men the crew is composed. Whether they are accustomed to the sea, and changes of weather, or if they are afraid of it? I have really sometimes, with great concern, seen men who came from inland countries, who, though they were robust hearty fellows, when they first came on board, were absolutely as much frightened, as if they had been struck with death; nor could they by any methods be induced to bear their new way of life with any tolerable degree of patience, till they had been accustomed to it for some time. But those who have been used to live near the sea, if they are young men, and without any particular anxiety

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anxiety upon their minds, live very happy on board, and divert themselves as occasion suits, with games and exercises of different sorts. It might not be improper also to enquire, whether they are of an active and industrious turn, or of an idle and sullen disposition. For (in order to make the proverb true, which tells us, that idleness debilitates the body, but labour strengthens it) they should always set about their work with a cheerful readiness, as we are taught by experience, that labour, when men are obliged to be beaten into it, contributes very little to the preservation of health. It should likewise be known where, and in what manner the men live when on board. When first they come on board they do, or should bring along with them a hammock, with a flock tick, a bolster and blanket, which is to serve them as a bed. The space which is allotted to each of them for hanging their hammocks is ten, or at most twelve Rhineland inches. These are hung on both sides of the ship transversely,

so

so that the rope of one end of the hammock is fastened to the side, and the other end fastened to the deck towards the middle of the ship. But it should be observed, that this method of placing them cannot be continued through the whole length of the ship, nor can they be hung transversely either at the head or at the stern, on account of the many hindrances which are crowded together in those parts. Now if we calculate the length of the ship, and at the same time carry in our minds the number of the guns which are placed between deck, it will easily appear, that the lateral spaces are not roomy enough to hang the hammocks commodiously, by which means many are obliged to lie in the middle of the ship, which is the worst place of all, as the rain and sea-water very frequently beat in through the hatchways, and wet them very much. Besides, the space which is allotted for the petty officers, and the sick, is always larger than that for the sailors and soldiers, which is sometimes so contracted, particularly

cularly when there is an uncommon number of sick on board, that it is hardly more than nine Rhineland inches. From hence it appears, that this method of placing them must be attended with great inconveniences, as those who are weakly and unaccustomed to this way of life very severely experience, by being obliged to give up their places to those who are more robust, and more used to a sea life, and get into any less commodious place, or lie upon a chest, or perhaps upon the floor. We may now enquire in what manner they live. Every morning at seven or eight o'clock they eat thick barley broth, with a little butter and salt. With this they generally eat a bit of cheese. When they have eaten half their meat, they mix the rest with a little beer or vinegar, lowered with water. This liquid pottage they call *Coefcoes*, and are very fond of it. On Mondays, Tuesdays, Wednesdays, and Saturdays, they have pease for dinner and supper, and stock fish with butter and salt. They may have likewise,

likewise, if they chuse it, a sauce with their fish made of water, vinegar and butter, but they are not very desirous of it, altho' they can get as much fish and pease as they want, as well as biscuit. On Sundays and Thursdays each man has half a pound of bacon for dinner, and grey pease; for supper only pease, with some mustard occasionally. If they ask for the sauce which they call *Smeer*, made of boiled lard, to eat with their pease, the cook always lets them have it. During their stay in Holland, or the neighbouring ports, their drink is small beer; but at sea they have only water. Every week they have a fixed quantity of butter and cheese. This is the sailors food in general, which at first is very sweet and good, but in the course of a long voyage is quickly spoiled. Their manner of life is likewise very singular. When they first go on board, they are obliged to work very hard, before they can get every thing in readiness for the voyage. But this in a

x P R E F A C E.

very irregular manner, as some days they are forced to work like slaves without intermission, and then perhaps have nothing to do all the week following. When they come on board, besides their hammocks, they generally bring with them ten or fifteen pounds of tobacco, a small keg of malt spirit, and cloaths sufficient to last them for the voyage. What use they make of all these, may be explained in a very few words. Those who have often been at sea are very fond of smoaking as well as chewing tobacco. As soon as they take the pipe from their mouth, they are sure to put some tobacco into it, which they never cease from chewing till it has lost all its taste and flavour. Perhaps they may do this as a preservative against the Scurvy, but probably more from an inveterate habit. The young sailors are fond of imitating this filthy custom, and even strive to excel each other in this most pernicious and disagreeable practice. They are equally fond of gin, brandy and wine,

wine, which, as long as they can get at, they are never sober, by which means the keg which was intended to serve them all the voyage is soon drunken up, unless the officers watch them very narrowly. When their liquor is gone they sell their cloaths and hammocks, and all their necessaries, to purchase wherewithal to get drunk. By these means they deprive themselves of those comforts and conveniences, which they would find of singular service to them in their voyage, and by being so continually drunk, provoke the officers to be severe with them, who generally indeed have very great reason to be dissatisfied with their conduct. By such punishments, in consequence of their misbehaviour, they not only are frequently very much terrified, but often lose every spark of their spirit and courage, and from having been bold and intrepid fellows, become dastardly and spiritless. Some of the men who have not been used to live very well on shore, eat the pro-

visions abovementioned when they first come on board so ravenously, that they load their stomachs in such a manner, as to be obliged to vomit them up again. It remains now to enquire in what manner they conduct themselves at sea. They live there much more soberly and regularly than at home, because they generally squander away half the things they bring on board, and because they find less opportunities of getting drunk, than when they are lying in a road. There is only one way then by which they can get at spirituous liquors. Some of the petty officers or others carry these commodities out with them to sea, in order to retail them at an advanced price to the seamen. If the sailors have no money to buy gin, they will sell their cloaths, if they are new, to procure it; or if that expedient fails them, the retailers have the good nature to depend upon their comrades promises, and flatter themselves with the hopes of future payment, when they

come

come on shore. But it is easy to see how very prejudicial this custom must be ; for on the one hand, the men are tempted to drink a vile adulterated composition ; on the other, the poor wretches are alarmed for fear of being beaten, if they do not purchase these commodities of the re-tailers. All these practices, however, must be carried on without the knowledge of the captain or the superior officers. In all other respects they live exactly the same as when in harbour, have time to sleep sufficiently, and are not likely to be greatly fatigued, unless there is a long continuance of stormy weather. How, it may perhaps be asked, do they live in foreign places ? If the ship stays any time in a foreign harbour, the men have money, tobacco and cloaths given them, which no doubt is intended to promote a good purpose, but answers directly the contrary, as they hardly receive enough to pay the debts which they have contracted during the voyage ; and if they have any thing

over and above, are sure to purchase with it spirituous liquors, and make themselves drunk. As for the tobacco and cloaths which are given them, they part with them to the bum boats which bring them provisions, fresh vegetables, and liquors from shore; by which means they counteract the good intention of their superiors, and live just as irregularly as when in their own country. We may now enquire into the employment of the men when they lie in harbour. It is often attended with very great labour and fatigue to the men to bring the ship into harbour, and to moor her; the rowers are obliged to get in provisions, water and other necessaries, for the use of the ship, which is no very easy work. Besides this, there are generally many repairs wanting in the ship, all of which must be done with as much expedition as possible, as there is frequently great danger in delaying them, and because it is the duty of all good seamen so to do. With regard to their keeping watch, it  
may

may be observed, that if the ship is moored, one fourth part of the sailors keeps watch at night, the three others are then allowed to sleep; but in the day-time all of them are expected to be ready upon call. If the ship is only at anchor, they keep watch as at sea. The day and night are divided into five watches, or four intervals of four hours, and one of eight. The sailors are divided in two classes, starboard and larboard watch, called *Princen* and *Graaf Mauritz Quartier*; these keep watch alternately, so that if the *Princen Quartier* keeps watch, the other part *Graaf Mauritz* has an opportunity of sleeping, which, when the four hours are elapsed, give up their place to the first, and watch four hours again. When this time is elapsed, the first class is called out again upon duty, and so on. These are the common watches at sea, which, as well as their other employments, they easily go through, if the weather is favourable, and the winds are not very violent. But if it is stormy

a 4                   weather,

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weather, there is often occasion for the whole crew to be all hands at work, by which means not only their regular method of keeping watch is broken in upon, and the men greatly fatigued, but by the waves breaking against the ship, and the impetuosity of the winds driving the water upon them, they are wet in every part of their bodies. Besides this, they are frequently liable to be disturbed by enemies. For every ship they meet or discover, the trumpet sounds, and they call to arms, upon which signal every one is obliged to bring up his bed and bedding tied together upon deck, which serves them as a breast-work. They often continue disposed in this manner for some hours, nay perhaps for a whole day and night. If it happens to be rainy weather, the men and their hammocks are consequently wetted all over, and when the business is over, they carry their hammocks down wet as they are, and go to sleep in them without their being dried, otherwise than

by

by the natural warmth of their bodies. From all these circumstances it must be obvious to every one, that a sailor's life is sometimes attended with very great hardships. It may be a matter of consideration likewise, at what time of the year the ship goes out. The season of the year without all manner of doubt influences the health of mankind very remarkably, as may be easily proved from the sailors who are more exposed to the inclemency of weather, than any other set of men. If they go to sea in the spring, it is always observed, that the men are much more healthy, than if they go out in autumn and winter. For in spring, besides the pleasantness of the season, the men, who have not been accustomed to a sea life, have six or seven months of fine weather to inure themselves to a naval life, which is not the case in the other seasons of the year. Besides, those who have not brought proper bedding or cloaths with them, or if they have brought them, have either sold

or

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or lost them, may very safely lie and sleep upon a chest in summer, which in autumn or winter is attended with dangerous consequences. Or if the men happen to get disorders in spring, they are much more easily cured, whereas scarcely four out of ten who get autumnal disorders escape the scurvy, which they often do not get rid of for the whole winter, nay, sometimes during the whole voyage. We may observe likewise, that in spring and summer five or six of the port holes are generally kept open, and the air sails hung up, by which means they let in fresh air between decks, and consequently dispel the noxious vapours. If by the weather being very mild, the air sails are not hung up, all the port holes are opened, and the air within the ship is as pure as that without; though indeed the weather is seldom so still, but if every part of the ship is kept open, it will expel the air contained in the ship, although there is no perceivable motion in the atmosphere; nor is it less likely,

likely, but that by the ship being occasionally raised and lowered by the waves, the air should insinuate itself in such a manner, as to purify that which stagnates in the vessel, and is impregnated with noxious particles. But in winter, as the weather is generally very changeable, the officers always order every part of the ship to be kept shut, except the hatchways, which should always be shut in rainy and stormy weather, but never are, unless there is an urgent necessity. Those likewise who are in health and spirits, have an opportunity of being constantly upon deck, when they are not upon duty; whereas in winter, when it is cold and rainy, and the ship is greatly agitated, they scarcely ever come upon deck, but hide themselves in any hole or corner, that the officers may not see them, and lie concealed there all day, unless they are under the surgeon's hands, and obliged to go to him, or else by being lousy, are driven away by their comrades. It may likewise be proper to  
enquire

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enquire for what country the ship is bound, whether the climate is healthy or otherwise, whether it is hot or cold, damp or dry. It is also a material circumstance to know how the shores lie, for the higher they lie, the more wholesome they are, while the low shores are very unhealthy, on account of the beech which is left bare by the sea, and the bodies of different animals which are left there to putrify. If they come to an anchor near shore, they should observe whether the wind blows from shore, or from the sea; for the wind from the latter is much more wholesome, and not impregnated with so many heterogeneous particles; and from hence it is, that the farther ships are from shore the more healthy they are. They should take particular notice likewise of the water which they find near the shore, whether it rises from a spring, or a river, whether it is marshy or brackish, whether it has any alum or vitriol in it, and with what matter it is impregnated; for the purer the water is, the longer it will

will keep sweet and fit to dress the provisions, and consequently will be preferable to all artificial mixtures. It should moreover be considered, whether they have a plenty or scarcity of water, as is frequently the case in some places, particularly the Indies, where good water is very dear, and indeed can hardly be procured. Indeed it necessarily happens, that sailors who make any stay in countries which abound with cattle, fruits and wine, reap great advantage in their health, whilst those who stay in dry and barren climates, and meet with little or no refreshment, must be more unhealthy. It may be proper also to consider, whether the voyage is a long or short one. Now a voyage may be called long in two respects. First, if the ship is bound for a very distant country, and a great deal of time elapses, before they arrive at the destined port. Secondly, if the ship cruizes backwards and forwards, and the men are detained a long time in harbour as well as at sea,

Now

Now there is a great deal of difference in these two. For those who are bound to very distant parts, live the same regular life for a long time, and may have good provisions and cloaths, excepting indeed the article of fresh water, which they cannot have in such abundance, as those who often put into harbour. Whereas those who are upon a cruize, are generally detained longer on board of ship before they complete their voyage; by which means they not only are unprovided with proper cloaths, and exposed to several hardships, but their provision, by being kept so much longer in the ship, is more liable to putrefaction than in the other case.

These things being premised, I now proceed to the matter itself. Every one must know, that sailors, as well as those who live on shore, are equally liable to all kinds of disorders. But experience tells us, that sailors are more particularly subject to some disorders, from the hard-

hardships which they go through, than those who never go to sea. On this account, I propose only to take notice in this Treatise of those disorders to which seamen are in general liable, and particularly of those which are most fatal on board men of war. And though my observations may not perhaps recommend themselves by their novelty, yet I hope to be able to demonstrate from them, that the disorders on board of ship are not so destructive, as some have imagined, and that though they may sometimes be fatal, yet that they have no peculiarities, with which physicians are not perfectly well acquainted. Indeed, if we form to ourselves an idea of the situation of seamen on board of ship, particularly when they are sick, and weigh all the circumstances together which attend them, the number of deaths which happen will be a matter of no great surprize. That I may be as clear and methodical as possible, I shall divide this Treatise into four distinct

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distinct parts. The first will contain an account of the disorders, and their causes, to which the men are subject at home; the second, those which are most prevalent at sea; the third, those which occur in foreign harbours; and the fourth, will contain some useful Remarks for the preservation of the seamen.

**A T R E A-**



A

# T R E A T I S E

## O N T H E

### Disorders incident to SEAMEN.

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## P A R T I.

### *On the DISORDERS incident to SEAMEN when at Home.*

SINCE ships are in general fitted out in Spring or Autumn, it may not be improper to recollect an Aphorism of Hippocrates, who says, *At all times of the year disorders of every kind may shew themselves, but at particular seasons some are more prevalent, and are attended with more violent symptoms*, Sect. 3. Aph. 19. Now

B

the

2    *On INFLAMMATORY FEVERS.*

the disorders which are most frequent on board of ship in the spring are inflammatory, continued, and intermitting Fevers, catarrhous disorders and swellings, particularly in the parotid and maxillary glands and fauces, and the Epilepsy. The autumnal disorders will be spoken of in their proper place.

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C H A P. I.

*On INFLAMMATORY FEVERS.*

I. **A** N Inflammatory Fever is that whose proximate cause is a stagnation of the blood in the serous and lymphatic vessels, which do not convey the blood along in its natural state, as likewise in the minutest recesses of the arteries, though they may still be able to admit the red particles of blood ; attended with a distension of the vessels, and a resistance or spasmodic contraction ; by which means the circulation of the fluids is disturbed, a fever is formed, and the particular part of the body, which is affected, is in pain. This happens

## On INFLAMMATORY FEVERS. 3

happens either in many parts of the body at once, or in one particular part alone ; from whence it arises, that this fever has various denominations ; for if the inflammation touches the membranes of the brain, it is called a Phrensy ; if the throat, a Quinsie ; if the side, a Pleuritic Fever ; and this last, with the peripneumony or inflammation of the lungs, is observed to be much more frequent here than any other inflammations. But it generally happens, that both disorders are united together : and if that is the case, it is called a Pleuroperipneumony. In both the breathing is short and difficult, attended with a short cough, and a painful oppression in the breast. Both are called the true Pleuritic Fever, if attended with signs of an inflammation and a continued fever ; but are called Bastard if the pain, tho' troublesome, is not accompanied with a violent fever and inflammation. But in the class of inflammatory fevers there are some which are idiopathic, or constitute the primary disorder ; others symptomatic or secondary,

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which are the consequence of some other disorder, but are in general of a fatal tendency. The latter of these do not constitute any peculiar disorder, I shall confine myself therefore only to the former.

2. The true pleurisy is an inflammation of the blood, in the membrane which lines the cavity of the thorax; which seldom happens (unless the disorder be very trifling) but it affects at the same time the external membrane of the lungs, and very often the lungs themselves, and the intercostal muscles. This disorder arises from a stagnation of the blood in the vessels of the pleura, the ribs, the periosteum, and the internal intercostal muscles, joined with an acute pricking pain in the side which is affected, and a short difficult breathing, with a continual hacking cough. In the beginning of this disorder the pulse is very hard and thumping, attended with great thirst and immoderate heat. But the peripneumony is an obstruction of the pulmonary vessels. This disorder differs from the other, on account of the superior

rior importance of the parts and vessels, which constitute this viscus. If the lymphatic vessels only are obstructed, an erisypelas of the lungs is the consequence. But if the disorder is more acute, there is an obstruction in the extremities of the bronchial artery. If it arrives to its worst stage, there is an obstruction in the very substance of the lungs, and in every vessel. An inflammation may attack either one or the other part of the lungs, or even both sides. In this dreadful disorder the pain is more tense, dead, and pressing than acute, and extends to the back and shoulders. There is likewise a greater difficulty and anxiety in breathing than in the pleurisy. The pulse is for the most part low and soft. The expectoration, by which a viscid and pituitous, and sometimes a bloody and various coloured spittle is brought up, is difficult, and generally attended with a swollen and remarkably red face; if the disorder increases, the patient is slightly delirious, and is desirous of sitting up, which

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is one of the worst symptoms ; for where it is observed, it is generally fatal.

3. The predisposing causes to these disorders are an advanced age, a great strength of body with rigid fibres, and every thing which by stimulating the vessels irritates and contracts them spasmodically, and accelerates the motion of the fluids. Men who by gross food and little exercise breed a great quantity of fizy blood, whom Sydenham very justly calls pleuritically disposed, easily fall into this distemper, if other accidental causes co-operate at the same time. The occasional causes which frequently occur on board of ship, are such as the changeableness of the weather, hard labour irregularly adhered to, *vid. Preface*, the immoderate use of burning spirituous liquors, excessive dancing, and thereby submitting the body to a sudden change from heat to cold. For it often happens, that sailors, when their work is done, and they have drank pretty freely, begin about the evening to dance and sleep after it in the open air ; which in the spring

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in this country can hardly be done without material detriment to their health. Others, whose turn it is to keep watch at night, oftentimes, when tired with their daily labour, sit or lie down upon deck, and can scarcely refrain from sleeping, which is a most dangerous circumstance. For when they are awakened by the cold seizing them, they get into their hammocks with their bodies half frozen, and sometimes are attacked the day after with some fatal disorder.

4. The diagnostic may be gathered from what has gone before ; the prognostics are collected from the natural habit of the patient, and from the violence of the symptoms. Yet still it is necessary to attend to the general tendency of an inflammation. And as every inflammation goes off either by resolution or tends to suppuration, or terminates in a gangrene or scirrhous, any one who understands the nature of the parts, may easily prognosticate the event. It is to be observed, however, that altho' every inflammation of the breast is dangerous,

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rous, it is often removed, if the inflammation has not touched the lungs very deeply, and if it is only on one side. If aropy yellow spittle tinged with blood comes up about the third or fourth day, if the pulse is quickened, or the fever remains when the pain is lessened, or in some measure remits; if the patient breathes more easily, if about the seventh, ninth, eleventh or thirteenth day the patient sweats plentifully, the fever generally abates; the sleep returns, and the spirits gain strength. If likewise the bloody spittle grows yellower and whiter every day, and is lessened in quantity, and if the urine lets fall a thick sediment. Purgings about the ninth day, unless they are very frequent, are not a dangerous symptom. On the contrary, the following circumstances prognosticate worse consequences. If the inflammation has touched both sides of the lungs, there remains then scarce any hope of recovery. If there is little or no spittle, and that is crude and viscid; if a laudable expectoration is suppressed from any cause with

an increase of the symptoms, and with difficulty brought on again; if the fever ceases and the pain remains; if the patient from the beginning of the disorder sweats profusely, which is always a bad symptom, but a most dangerous one, if the pain ceases the third or fourth day, or shifts its place, accompanied with a delirium and standing drops upon the face; if likewise the patient thinks but slightly of his disorder, and is desirous of getting up, and of setting up too long, and if the first day of his disorder a delirium shews itself, which I have often known to be the case. But if after the delirium a lethargy comes on, death will very shortly be the consequence.

5. The pleurisy is not attended with so much danger. But I have never met with this disorder separately on board of ship; I shall therefore (as the symptoms and manner of cure in these disorders are nearly similar) dwell here in general only upon the inflammation of the pleura and lungs, tho' I do not deny, but that the pleurisy some-

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sometimes occurs distinctly. But I have never been able to discover the real truth by dissections of bodies destroyed by those disorders, tho' I have learned from those and other observations, that the general termination of an inflammation of the breast, is in a resolution or gangrene. Yet we often enough see inflammations of the breast in patients on shore terminate in a suppuration, which in all the cases that I have been concerned in at sea, I never observed but twice; perhaps on account of some disadvantages which are unavoidable on board of ship, or some more untoward circumstances which sailors labour under; whence it happens, that they suffer more severely in their several disorders than landmen, as will readily appear in the following Treatise. Whenever I dissected the bodies of people who died of an inflammation of the lungs, I regularly saw one or both the lobes of the lungs gangrened; but in the side where the pleura was affected that lobe was constantly gangrenous. In April and May 1760, this dreadful disorder

On INFLAMMATORY FEVERS. II

order raged epidemically on board the *Princess Carolina at Helvoetsluys.* On dissecting several bodies at that time, I found in all of them the lungs very hard, and as black as ink in the sides and parts situated near the back. They were generally swimming in a reddish serum, and the pleura in some of them was not affected. The process of the disorder was as follows. At the beginning of it the patients found a difficulty in breathing, and a pain afterwards in one or both sides, or under the breast bone, which reached as far as the back. Where the inflammation or rather obstruction was very great at first, I observed they were restless, unusually disturbed, and a little delirious. After some few hours, or perhaps a day, they were very desirous of getting out of bed; and if I attempted to persuade them to keep their beds, they always said their disorder was not violent enough for that, and insisted upon not remaining there any longer. They then seated themselves as well as they could upon some chest, but could not

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keep that posture long, and were obliged to get back into their hammocks. In four and twenty hours, or after the second or third day, or at the utmost after the fourth, a wheezing came on, and their mouth and nostrils were filled with a white froth, which, tho' I ordered it to be wiped away continually, increased as fast as it was removed. I tried every expedient I could think of to prevent a lethargy, but all to no purpose, nor could I by any stimulatives recover the patients from it. Their head, breast and arms ran down with sweat; their pulse, which before was small, soft, and quick, now began to intermit, and at length death closed the scene of this dismal spectacle. All of them were very desirous of drinking cold water, which their brother sailors very imprudently gave them, and was always fatal, especially in those where the disorder was but yet slight; and they having borne it for some days, had now begun to spit. Where it was very severe, I never observed that the cold water took any particular

ticular effect, either in hastening or retarding their death. This however is certain, that whatever remedies I applied in their unhappy state were ineffectual; nor do I remember a single instance of one, who was delirious at the beginning, or desirous of sitting up, surviving the disorder. But I made one observation, that if I took away a good deal of blood at first, they lived to the third or fourth day, if I did not, they generally died the first or second. I will now beg leave to give an account of one case, where the patient had a peripneumony; and another of a person who shewed some symptoms of that disorder, but in reality had another. *John Goedhart*, a very stout young fellow, about twenty years of age, and full of blood, enjoying a perfect state of health, danced and sung one evening. On the following day, the second of June 1760, in the morning, he was deprived of every sense, and was motionless. I happened to be absent at that time. At four o'clock in the afternoon, when I went on board, and saw him

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him in his hammock, I found that he had sweated violently, that his mouth and nostrils were full of a white froth, and that his pulse was low and intermitting. He died about eight o'clock the same afternoon. The next day, on opening the body, and taking away the breast bone, I found the anterior part of the lungs red and livid, and swollen with blood ; but in the side and posterior part, the lungs on the right side were hard and as black as ink ; the left were nearly like the right, and on dissecting them, a very little serum mixed with some black coagulated blood issued from them. Besides this, in the right sinus of the heart, I found some black coagulated blood, which distended it and the vessels ; and in the cavity of the thorax I found six or seven spoonsful of liquor swimming about like bloody water. As for the other viscera, they were all perfectly sound. *Hendrik Simnerman*, a very stout man, and a great drinker, about sixty years of age, was seized with a weighty pain in his breast under the sternum, which

which spread to the left shoulder-blade. He found a great difficulty in breathing, and was delirious a little. His pulse was quick and full, but intermitted greatly. I took from him almost a pound of blood, from the arm of that side which was affected. The blood, when it was cold, had a green pellicle on the surface. I ordered a glister afterwards, and put a bladder filled with an emollient decoction on the diseased part. After an interval of some hours he mended greatly, or at least appeared to do so, for he breathed more easily, and his pain abated, but his pulse continued to intermit. I ordered him a small ptisane made of barley, liquorice, grass roots and honey, to be drunk warm for his common drink. In the mean time I took away some blood from him occasionally, but he remained in the same state; and tho' he was delirious, gave very pertinent answers to the questions which were put to him. The second day he complained of hunger, but I did not suffer him to eat any solids. When he coughed, he brought

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brought up a yellow, thin, slimy matter, but all this time had no sleep at all. The third day I found him sitting upon a little tub with a lighted tobacco pipe in his mouth. He told me he was perfectly recovered. His pulse still intermitted. I ascribed this intermission to some other cause, and not to the inflammation, and persuaded him to go to bed again. About the middle of the same day, in attempting to get out of bed, he fell down dead suddenly on the floor. And here I would observe, that altho' this man had been troubled with a cough for four or five months, he had eaten his victuals very well, and drank rather plentifully, nay, even so as to be generally intoxicated in some degree, though not so much, as to disable him from doing his duty. For the space of ten months, though I saw him twice or three times a day, I do not remember that he ever complained of any thing but a cough, which he took no other remedy for but gin. I opened his body the 25th of May, 1760, and on lifting

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up the breast bone, and dividing the pleura and cellular membrane under the breast bone, a nauseous green matter issued out, mixed with small white particles like a suppurated membrane. On putting my finger into the orifice, I found the heart and the great vessels swimming in pus; afterwards, upon taking away the bone, I opened the pericardium, by cutting it obliquely towards the left side. It was so hard as to resist the scissars, at thick as one's little finger, and so dilated, that it contained, besides the heart and vessels, three pints at least of corrupted matter. When this was let out, the heart appeared of a white and yellowish colour. This colour arose from the pellicle, which was of a white wooly smooth matter, which surrounded the heart the thicknes of half a line, and was so tough, that I could take hold of the heart without separating it, tho' not so as to separate it from the heart, for if it was handled too much, it ran into clots. When I pared it away gently with my knife, there appeared a fleshy

substance of the heart, deprived of its external membrane. The muscular fibres were not very plain to be seen, but the heart was surrounded with small tubercles, which looked like those wounds which are observable when the epidermis is separated by a burn from the skin into blisters, and the blisters disappear in a few days, then such tubercles as these abovementioned are plainly observable. But the heart was paler than usual, and had not the least fat on it. The fleshy substance was somewhat hard, and in it I found towards the basis, five little stones or bones almost round, as big as peas, and a little flattened, which I could hardly divide with my penknife. In the opening into both the arteries, I likewise found some little bones, but they were slighter, and were placed in such regular order, that on the left side they formed a compleat ring, but on the right more than a semicircle. When I took out these, I found I could divide them easily. I afterwards found in both ventricles of the heart a yellow polypose matter, adhering

to the heart, but easily divisible. The pericardium, besides its enormous size which spread almost to the neck, appeared in the internal part like the heart, but not so even. The lungs were small, contracted, and depressed, but appeared in all other respects perfectly sound. The membranous part of the diaphragm was ossified the width of three fingers, so that I could not dissect it with a dissecting knife, or bistouri. The other viscera appeared to be sound. I apprehended, the courteous reader would not be displeased to have this case described, tho' it is not immediately connected with my design, since it is an uncommon one, and not totally useless. For it does not seem probable, that so great a quantity of corrupted matter should be collected in so short a time; and if it had lain there a long while, it is surprising that he should not feel greater inconveniences from it.

6. Having explained the nature of the disorder, it remains now to speak of the method of cure. But before I do that, it

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may be proper to make some preliminary remarks. First, the person whose office it is to attend the sick on board of ship, should, after hearing the case, enquire particularly whether the patient has a hammock and proper covering ; and if he has not, make it his business to go to the captain, or in his absence to the first lieutenant, to procure them for him, if he wishes him to recover. He should then take care that the patient be put in his hammock, and if possible covered up warm. And as it is customary, that the sick on board are put towards the forecastle on the starboard side between decks, care should be taken that some covering be put between the hammocks and the hatchways, lest the air, which often blows pretty fresh from the larboard side of the ship to the starboard thro' the hatchways, should be prejudicial to the patient, especially if it happens to be cold weather, and he has no covering for his body. The surgeon on board should likewise be very careful, not only that one or two of the

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portholes nearest to the sick person should be kept shut, if the wind blows on the starboard side of the ship; but also, that every operation respecting the sick people, contrary to the general custom, should be performed in their hammocks, lest they should be obliged to walk upon the cold, and even oftentimes wet floor with their naked feet, or sit upon a chest whilst it is performing; if, for example, a vein is to be opened, or a glyster or fomentation to be applied. The people likewise who are about them, should have proper conveniences near at hand, to prevent them from getting out of their hammocks to go to stool, or make water, especially if they are very bad. But above all things, it will be necessary to keep the drunken noisy fellows and smoakers of tobacco away from them; unless these precautions are taken, little can be expected from medicine.

7. The indications of cure are to make a derivation of the blood that increases the stagnation of the fluids, whilst it presses

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on the diseased part; and to give room for diluents, so that the quantity of the gross and impacted humours may be diminished, by lessening the resistance which they meet with, and by increasing their fluidity. This is brought about.

1. By repeated bleeding, which the sooner it is administered, the more useful it will be. A large aperture should be made in the arm nearest to the affected part, and if the disorder is violent, particularly if the patient is of a plethoric habit, and his fibres are rigid, a pretty large quantity should be taken from him. The strength of the patient, however, in these cases should be attended to. If what he spits up, or any other symptoms should give signs of a kind resolution, a vein must not be opened, and scarce ever ought to be beyond the fourth day. If the symptoms indeed are violent, it may be used after that time, and in different places. If after opening the vein the pain rises to the clavicles, it is reckoned a good sign,

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2. By diluting the gross fluids, and relaxing the vessels, in which the obstructed particles are impacted by thin decoctions free from any glutinous quality, such as are of a saponaceous nature, made with nitre and honey, which should be sipped frequently warm, or lukewarm, and that in small quantities. These decoctions may be made of marshmallows or common mallows, pellitory, and violet flowers. These should be boiled a little in a sufficient quantity of water; adding at the latter end of the boiling, a bit of liquorice root, scraped and bruised, and when strained off, a little nitre. Milk likewise, if it can be procured, diluted in double or treble the quantity of water, is very good, but a simple decoction of barley with nitre and honey, which may always be had, is fully sufficient for this purpose. But if nature seems inclined to throw off the disorder by spitting, oxymel, either simple, or of squills, may be very seasonably added to this decoction in the room of simple honey. But if the fever and

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thirst increase, syrup of lemon juice may likewise with good effect be put into the abovementioned decoctions, or currant jelly and cream of tartar. If the patient finds his pain and want of sleep continue obstinate against these remedies, emulsions may very properly be given, made of sweet almonds, seeds of pumkins, gourds, melons, endive, lettuce, poppies, adding some syrup of the five aperient roots, or althea, violets, or diacodium ; nay, even opium itself will be found an excellent remedy in very violent pains. But it should be remembered, that anodynes must always be given with great care and circumspection. Warm vapours breathed up by the nostrils are likewise very serviceable. These may be procured by boiling water with some flowers of elder, camomile or melilot, though even warm water alone may answer the purpose. Besides this, if the body is bound, it should be opened by emollient glysters ; but if it performs its functions naturally, the glysters should

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be omitted; for that good purpose is much better answered by drinking now and then oily lubricating liquors, which I have often prescribed in the following manner with good success. Take two ounces of the oil of sweet almonds, half an once of the syrup of violets for one draught. I always took care, that this oil on board of ship should be drawn from the almonds without heat; which was easily done by means of an iron press. As for fomentations, which are generally applied to the breast and abdomen, they should be omitted. Bladders filled with hot oil, or an emollient decoction, or milk, when applied to the diseased part, are, according to *Aretæus*, very serviceable in these cases; but bladders cannot be had in sufficient quantity, or if they could, would not keep well without being eaten by little insects. Glysters are not very frequently given, because they cannot be administered conveniently in sailors hammocks, and the patient should by no means

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means ever get out of bed, for fear of the cold striking to him. But if the necessity of the case requires, that such an application be made, he should be let down gently with his hammock, and placed upon a chest, and kept covered against the cold, and then raised up again, all which however is not totally free from inconvenience. Besides, when sailors lie with their cloaths upon them, and are covered with them instead of bed cloaths, the fomentations soon grow cold, and as often as they are applied, expose the sick person to the cold air. Besides, they drop upon the cloaths, and make them wet, which gives them cold again, and therefore I look upon them rather more detrimental than serviceable. But if proper conveniences can be had, they may be used.

8. But in reality these dangerous disorders seldom go off by a simple resolution, so as that the peccant matter being sufficiently divided, may be thrown off by

by insensible perspiration, or be so perfectly assimilated with the healthy fluids, as to flow with them without the circulation being impeded; but are generally terminated by some critical and sensible evacuation: so that the diseased matter may be evacuated by the emunctories of the skin, by stools, or urine, or so subdued by the nature of the fever, that the material cause may be forced out by the rapidity of the circulation into the windpipe, and be thrown off by spitting. If these evacuations are made properly, and soon enough, both disorders are for the most part very happily removed. To facilitate the success of this evacuation, the abovementioned assistances are well recommended, particularly oxymel of squills. The following lohock is likewise very useful. Take two drachms of sperma ceti, a drachm of diaphoretic antimony, a scruple of saffron, an ounce and a half of oil of sweet almonds, the same quantity of Fernelius's syrup of marshmallows; mix these together, and let the patient often

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often take a spoonful of this mixture. But as that necessary and wholesome evacuation is hardly ever duly promoted on board of ship, by reason of the changes of the weather, it is proper therefore to attend as much as possible to the other termination. That is, when the diseased matter moves about, and has passed thro' the extremities of the arteries into the veins, but is not so changed, that it can flow with the rest of the humours without the circulation being hindered, nor so transformed, that it can be lost in insensible evacuations, and be evacuated by sweat, urine or stools. Then, if there are any symptoms of concoction, and nature is not strong enough to free herself of her assailants, it will be necessary to use the advice of *Hippocrates*, to carry off what is to be evacuated thro' the channels, and in the manner which nature points out, *Apb. 21.* But here I must observe, that all hot and very strong evacuants must be carefully avoided, for nature must be kindly assisted and not disturbed; and this is most conveniently

biently done, by a strengthening diet, with the use of a little wine and some spices. If the diseased matter seems directed towards the skin or the urinary passages, then gentle diaphoretics and diuretics, and especially of the small, watery kind, may be given with success. The following decoction has been of the greatest use in these cases. Take of sarsaparilla, fennel, grass roots, of each half an ounce; an ounce and a half of liquorice scraped and bruised, pellitory, agrimony and sage of each half a handful, two drachms of fennel seed, let them be boiled in five pints of water down to four, and then strained clear; when it is strained, add four drachms of pure nitre, or of sal polychrest. Of this I generally ordered the patient to drink a warm tea cupful very frequently. If a gentle purging should follow, it must by no means be stopped, for the disorder often goes off in that way. On which account *Galen, in Comment. Aph. 16. Sect. 6. Chapter. Tom. 9. pag. 256,* says, that in a slight pleurisy, or peripneumony, a diarrhoea

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haea may sometimes be of service, by way of evacuation, and particularly so after any symptoms of concoction have appeared, and if the disease is not of a dangerous nature. Hence if it is known, that nature points that way, gentle loosening medicines may be used, such as manna and thubarb ; and these, if the fever and pain abate, are generally indicated. With respect to emetics and purges though often indicated, yet they should scarcely ever be given, on account of the fever, and the symptoms which shew themselves, in the beginning of these disorders. But on their disappearance after some days, this indication also for the most part ceases. I have however given them sometimes, tho' not always with good success. The pains indeed have sometimes abated for a few hours, but in a short time have been as violent as ever. On this account I think it better to abstain from them in such disorders as give way to milder medicines. These are the remedies which in general are sufficient for the cure of this disorder  
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when in a mild state : but if this disease terminates in a suppuration, and forms an abscess or a vomica, other methods of cure must be followed, for which the proper authors should be consulted, since there is nothing particular attending this disorder at sea, unless that by the weather, and the way of life on board of ship, and from several other circumstances the patients can have little or no hope of recovery, excepting perhaps one or two, who may be cured by a chirurgical operation. If it terminates in a scirrhus, it produces an asthma, which is sometimes cured, tho' with difficulty ; but yet, however, it is not attended with so much danger as is often apprehended. If the morbid matter be translated to any one part of the body, and rest there, it then produces another, and generally a fatal disorder, and in that case those remedies are of service, which drive the distemper to some less important part of the body ; particularly large blisters on the legs. If it terminates in a gangrene,

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grene, there then can be no farther hopes of recovery.

9. It is the province of the surgeon to attend likewise to the diet of the sick people on board, which ought to be very light and moderate, particularly in the beginning of the disorder. For which reason all hot, thick, glutinous and solid food should be avoided ; and though the patient should object to that strict regimen, a prudent and skilful surgeon will not easily give it up. And as the diet is of the highest consequence in these disorders, he should require at the steward's hands such kind of food, as is proper for the sick on board, which should be the best, and cheapest that can be procured. He should likewise examine the food, whether it is dressed properly, for the cooks often dress it in such a manner, that even people in health cannot touch it, much less those who are sick. In the beginning of the disorder, panada and milk, if it can be procured, mixed with twice or three times as much water, is very proper, as well as chicken

chicken broth. If the disorder has continued some days, and that is found not strengthening enough, a more nourishing diet may be made in the following manner. Take one pound of biscuit, eight pints of common water, boil them in an earthen pot covered, or a copper saucepan well tinned, for an hour, then pour in as much hot water as boiled away, and let it be strained; when that is done, add a little powdered cinnamon, or cinnamon water, some lemon juice freshly squeezed, with a little sugar candy or sugar. It may not be improper to add likewise a little Rhenish wine to this decoction, which will make it a good and agreeable diet. If you want to make the food more strengthening, you must boil it longer, and add no water in the boiling, for the longer it is boiled, the more nourishing it is. This decoction, when cold, becomes a jelly, and is called either panada, or jelly of bread. Such a panada may be easily varied when mixed with milk, meat broth, Rhenish wine, a little water or

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34 *Of the BASTARD PERIPNEUMONY.*

beer, with or without the yolk of eggs, and makes a very nourishing diet. An agreeable solid food may at all times also be easily made from barley, rice, or millet.

10. I come now to speak of the spurious Pleurisy, and Bastard Peripneumony ; the first of these may be classed under rheumatic complaints, I shall therefore defer what I have to say upon that subject, till I come to speak of winter disorders, but think it necessary to enumerate the diagnostic symptoms, lest the two pleurisies should be confounded together. In the bastard pleurisy, there is an acute and pungent pain in the side, which is sometimes increased by touching it, so as to render it painful to lie upon the side which is affected. It is attended with a dry cough, and is very common to people who have scorbutic catarrhs and rheumatic pains, accompanied with little or no fever. The bastard peripneumony is that which is caused by a pituitous lensor in the blood, arising from the cold which obstructs the vessels of the lungs. This disorder

*Of the BASTARD PERIPNEUMONY.* 35

disorder is more apt to attack weak and phlegmatic people, who are subject to catarrhous disorders, than those who are young and alert. It generally follows all the causes which are capable of putting the humours into motion, as in the real peripneumony, such as heat, labour, dancing, drunkenness, &c. especially if any sudden cold succeeds. This disorder makes a slower progress than the real peripneumony. In the beginning of it, there are scarcely any pains but in the head, nor any fever attending it, but an oppression upon the breast, occasioned by the difficulty which the patient finds in breathing. When the disorder gains ground, it is attended with a shivering, and the symptoms of a slight fever. The face grows pale and swells, the eyes stand out and move with difficulty; then a restlessness comes on, and a small intermitting pulse, attended with a great anxiety and a desire of sitting up. If a delirium, and a white frothy spittle succeeds, with a wheezing in the lungs, the patient will soon be carried

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36 Of the BASTARD PERIPNEUMONY.

ried off. It is to be observed, that this disorder does not occur so frequently on shore, as when the ships winter it at sea, or in port, and the men for want of proper bed cloaths and covering suffer from the severity of the weather. For exclusively of the cold, great part of this len-tor is generated in the body from the very hard food at sea, and from their inactive way of life: from whence it happens, that many are seized in the spring with disorders arising from phlegm in their breast, which has been before observed by *Hippocrates*, who tells us, that phlegmatic disorders prevail in the winter season, but in summer, diseases generally attack the head, and that part which is above the diaphragm. *De Salub. Vict. Rat.* pag. 338. *Sydenham* likewise has observed, that at spring and fall every year fevers are very common, attended with many peripneumonic symptoms, which he calls the bastard peripneumony. *Cap. 4. de Peri.* pag. 107. But altho' this disorder is not so dangerous as the real peripneumony, yet

yet the same part is affected, and they have many symptoms common to each other. There is a great difference however in the material cause ; for in this disorder there is a cold and mucous lento, which is easily diluted by warm water, which however is not the case in the inflammatory sort ; it is therefore very necessary to distinguish the one from the other, as they are equally fatal, if they are improperly treated.

11. The same observations will hold good in the cure of this disorder, as in the true peripneumony. In the beginning of it, the patient must be let blood, but in less quantity than in the other, since in general this disorder attacks people of weak viscera, in whom the fluids through the weakness of the vessels have contracted a morbid phlegmatic lensor, and therefore a great quantity of blood cannot be taken from them, without considerably impairing their strength. For it is manifest, that debility arises from the assimilation of what is taken into the constitution be-

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ing impeded, and by a want of liquid, vital, sound and good blood. *Vid. Com. Van. Swieten in Aph. Boerhaave, § 25. 43.* where it is very sensibly observed, that letting blood too often increases the material cause of the Bastard Peripneumony, and is on that account of more prejudice than service. *Sydenham* likewise has very properly observed the same thing, from having found, by frequent experience, that Phlebotomy, often repeated, was attended with fatal consequences to those who were of a gross habit of body, particularly when they were advanced in years. *De. Peripn. North. pag. 168.* After opening a vein, we generally order a glyster prepared with honey, nitre, and decoction of barley. External heat, warm fumigations, and warm, thin, attenuating, saponaceous liquors, have likewise been found to be of the highest service, as in the real Peripneumony. After opening a vein once or twice, I have sometimes given with very good success the following purge after *Sydenham's* method. Five drachms

drachms of Epsom salts, an ounce and a half of manna, dissolved in three ounces of hot water, at a draught. If the patient is troubled with violent pains in his breast, I generally apply large bladders to the affected part, which almost always removes the pain, and makes the breathing easier. Attenuating medicines are likewise used in this disorder, particularly oxymel of squils, and sudorifics, if they are not too hot. Last of all, the food ought to be very thin and lightly nourishing, with the addition of a little wine, and thus, by proper medicines seasonably applied, this disorder is easily moved.

12. But before I conclude this subject, I think it may not be improper to describe another species of Pleuro-peripneumony, which sometimes occurs on board of ship, in consequence of great contusions about the breast. For if a hard body is dashed with great force and swiftness against the thorax, particularly about the intercostal parts, the lungs themselves may very naturally be hurt;

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or the stroke, by the elasticity of the ribs, may be communicated to the luugs, whilst the ribs remain whole; or when the muscles of the thorax, or the periosteum of the ribs are bruised, and a pain, a fever, and inflammation arises in consequence, the dilatation of the thorax is obstructed in the same manner, as in a true pleurisy, and from thence likewise the expansion of the lungs, and a free circulation of the blood through them is prevented, and a peripneumony succeeds. I saw in so short a time as three days, a fatal instance of this from a violent contusion on the back of one *Philip Walter*, on board the *Princess Corolina*, which carried the symptoms of the true Pleuro-peripneumony. On opening his body, the posterior part of the lungs was hard and black. The pleura in the sides and the posterior part of the thorax were as black as ink. I found some coagulated blood between the skin of the back and the muscles, and between the muscles themselves quite to the pleura. But although these cases observed,

properly belong to surgery, yet it may be observed, that in violent contusions of the thorax, the patient not only has violent pains, and also an hæmorrhage from the ruptured vessels in the lungs, but after they have borne the pains for some days, they spit a black grumous blood mixed with pus, though in the beginning of the disorder no blood appeared in the spittle. For this reason, these cases are in some measure like the pleurisy, and peripneumony, and require nearly the same method of treatment; a circumstance which naval physicians and surgeons cannot be ignorant of, without great detriment accruing to the sick, as contusions are no where more frequent than on board of ship. What respects their cure it is performed for the most part by opening a vein, and repeating it according to the violence of the symptoms, by the application of external resolvents, by watery potions, which resolve and temper the motion of the fluids, such as are made of water with some simple oxymel, syrup of lemon juice and nitre.

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If the hæmorrhage is very great, besides a copious venesection, the body should be kept quite quiet and in moderate heat. The patient should be placed in a cool temperate place, his drink should be nourishing but small, in order to moderate the too quick circulation of the blood, and should likewise be somewhat astringent. Cold water mixed with spirit or oil of vitriol, or sulphur enough to give it a pleasant tartness, as also juleps, made with a decoction of hartshorn, or bread, and a little conserve of roses, or some other things of the same kind are extremely proper. Besides these, decoctions of vulnerary and balsamic herbs, and even the Balsams themselves may be very properly given. At first the nourishment ought to be light, as for instance, panada, without wine or spices, meat broths, and afterwards rice or barley gruel; nor should the patient be suffered (as is but too commonly the case) to keep up his spirits by drinking spirituous liquors, or wine. If he finds a difficulty in breathing on account

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of an Emphysema, the air should be let out by incisions : I saw an instance of this on board of the above ship in the year 1759, Septem. 15, in a very stout man, one *John Ober*, who fell flat from the main yard into the sea, but in such a manner however as not to touch the ship ; on bringing him in a boat into the ship, he brought up a great quantity of blood from his lungs, and after pulling off his cloaths, I examined the thorax, but could not find the least trace of a contusion or fracture : I ordered him to be put into his hammock, that he might get warm ; when he was warm, he complained of a great difficulty in breathing, and of a violent heavy pain in his breast under the sternum. I ordered some blood to be taken from him at different times, but his shortness of breath still increased, to so great a degree, as to lead me to think he would soon be suffocated. In about sixteen hours there appeared all of a sudden a swelling in his neck, and in the upper part of his breast in his breast bone, which seemed to relieve him

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him a little as to his breath. On cutting the swelling long ways, the air issued out with a crackling, and then with a hissing, upon which he breathed much easier; the haemorrhage lessened by degrees, and the man soon got well. I think this may be sufficient on the subject of contusions. But if a farther knowledge is requisite in those matters, such books in surgery, as treat of wounds and broken ribs, may be consulted.

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C H A P. II.

*Of FEVERS.*

I. **E**Xperience tells us, that fevers are not so frequent at this season of the year, and that they are by no means so dangerous, as at other times, nor so difficult to be cured. Those which usually prevail in spring at the beginning of fitting out the fleet, are for the most part simple, continual, quotidian fevers, quotidian and tertian intermitting, and catarrhous

tarrhous fevers. I say at the beginning, because if the ships have been at sea a whole year, or thereabouts, the case is very different. I shall therefore refer the description of these to the third part of this Treatise, where I take notice of their stay in foreign ports, and only slightly touch at present upon the catarrhous fever, as being a disorder which very frequently occurs, and is sometimes fatal on board of ship.

2. Amongst the diseases which the different seasons of the year bring along with them, none is more frequent on board of ship in Spring and Autumn than this catarrhous fever. And in such different ways does it affect the men, that the disorders which are derived from this source can scarcely be enumerated. But strictly speaking, only three disorders can be ranked under this class, viz. if the humour is carried to the nostrils, it is called a *coryza* or cold; if to the throat, a hoarseness; if to the breast, a catarrh. But these three are often united, and attended with a fever more or less violent, in which the patient feels

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a languor, and the common symptoms of a fever. It generally begins in the evening with a shivering, and a coldness in the extremities, particularly the feet. It is usually attended with the head-ach, an uneasy sensation in the nostrils, the throat, the breast, and the loins, and an inclination to making water, with a great thirst. In the morning, in consequence of a profuse sweat which very often happens, and a pituitous excretion from the nostrils, or the bronchiæ, the symptoms generally abate. In other cases a diarrhœa succeeds, which commonly relieves the patient.

3. The immediate cause of these symptoms is no other than the serum, or acrid lymph, which arises from perspiration being stopped, and stagnating in the vessels on the surface of the body, particularly the cutaneous ones, which irritates, stimulates and causes an inflammation. This chiefly breaks out in the nostrils, the throat, the windpipe, and the bronchiæ. Nay oftentimes, the œsophagus, the stomach, and sometimes the whole intestinal canal is affected

fected by it. This disorder is heightened by every thing which contributes to the accumulation of the sharp humours in the body, such as too much hard food, too sedentary a life, a cold and damp air, and in short, every circumstance which hinders the due succession of the secretions and excretions of the body, particularly of perspiration. Hence it is, that in spring, from the changeableness of the weather from hot to cold, and from dry to damp, and, *vice versa*, this disorder is very prevalent. For at that time the humours, which from the forementioned causes have been generated in the body, or stagnated in the cavities of the body, or contracted a lento when the warmer weather comes in, are hurried into motion, and the size being enlarged by the heat with an increased circulation of the blood, become more fluid and are driven to the emunctories of the skin, and evacuated. From whence it appears, that if that greatest and most wholesome evacuation of the skin is either not properly performed, or totally ceaseth,

these

these effects may then very naturally follow.

4. Altho' this fever has many symptoms in common with the quotidian intermitting, it still may very easily be distinguished from it. For the catarrhous fever makes a slower progress, and always comes about evening. Besides this, the pulse is never so strong as in the quotidian, and comes oftener with a violent cough and a vomiting. Nor do the symptoms abate when the paroxysm is ended, but the heaviness of the head, and the numbness of the limbs remain. This fever differs likewise in the cause which produces it, and the subjects in which it is produced. But it is seldom dangerous, unless the patient lives upon improper diet, and is improperly treated, on which account strong hearty men do not much regard it, tho' it is attended with great uneasiness in weakly people, who abound with sharp humours. In the spring when the weather is mild, it almost cures itself, or at least is very easily cured; but in autumn while the cause continues,

continues, it does not yield so readily, and often terminates in some worse disorder, as a consumption, or the scurvy, which is but too often the case on board of ship, and is in general to be ascribed to the negligence of the patients, or the surgeons.

5. If the patient finds a difficulty in breathing in the beginning of this disorder, and if there are any symptoms of a plethora or an inflammation coming on, opening a vein once or twice will be of great service, though it should be omitted in a slighter attack. With respect to diet, if the symptoms are violent, it ought to be light, as for instance, meat broths, pana-dæ, &c. on the contrary if they are not severe, and the patient's stomach requires it, he may eat such food as is composed of oats, barley, rice, bread and beer. Otherwise they will satisfy their hunger with pease, and bread and cheese, from which no one can make them refrain; nor indeed is it necessary to prescribe too light a diet, as it might weaken them too much. With regard to drink, that ought to be very weak, dissolvent and softening,

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as ptisane made of barley, sarsaparilla roots, marshmallows and liquorice with raisins and figs. Instead of this ptisane, I have often ordered the following tea to be drunk very hot, and found it answer the purpose very well. Two ounces of elecampane and liquorice roots, a handful of violet, marshmallows and poppy flowers. A drachm of saffron, Paul's betony, hyssop each a handful, two drachms of fennel and anise seeds, these when cut and bruised and mixed well together make a very good tea. If there is any reason to believe, that there is any crude undigested matter in the primæ viæ, or any phlegm fluctuating in the stomach, which are often productive of a cough and vomiting, it should be immediately removed. And for this purpose one scruple of ipecacuana is very useful, as it very frequently eases the cough greatly. If a purge is necessary, it should be composed of very gentle loosening medicines only, as manna and rhubarb. All very strong purges and hot medicines must be strictly guarded against, lest the fluids should be driven too forcibly towards

towards the intestines, and a dangerous inflammation should be the consequence. The above method of treatment, if the weather is favourable, is sufficient for the cure of this disorder. But if it is attended with a violent cough, and there is danger of a slight inflammation, then such remedies must be used which soften the acrid matter, stimulate the membranes of the wind-pipe and the bronchiæ, and excites the cough, such as absorbents, oily medicines, *sperma ceti* and emulsions. In which cases the following sweets are very useful, viz. the syrup of marshmallows made according to Fernelius, the syrups of violets or of poppies, diacodium, sugar candy, Spanish liquorice, honey, and even that thick and sweet Spanish wine called Malaga.

Besides these syrups, gentler anodynes may be used, such as Pill. Cynoglossi, fix, eight or ten grains; fifteen or twenty drops of *Sydenham's* liquid laudanum, if given in the evening in a proper liquor. But altho' these medicines have this most salubrious effect, they must never be used

but with great care and circumspection, nor should they be used too long, lest the vessels should be too much relaxed by them.

6. But in the removal of this disorder, nothing is found to be of more service, than a discharge by the skin, and therefore great care should be taken to restore perspiration. And in order to this, besides proper cloathing, the ptisanes and warm infusions abovementioned, together with decoctions of sarsaparilla, china roots, polypoly of the oak, liquorice, sassafras shavings, with raisins and a little cinnamon, are of great service. Some anise seeds and fennel may likewise be added; rob of elder, diaphoretic antimony, nitre and flower of brimstone are likewise very good. I have also often prescribed a grain of camphire, with two drachms of theriac. androm. at night, by which the patient generally found great relief. And in order to dissolve the viscid matter which stagnates in the vessels, besides the above medicines, I have given balsam of sulphur, with anise seed, gum ammoniac, and its essence, myrrh, benzoin, powder of elecampane root, and floren-

florentine iris. But where a stronger remedy is necessary, oxymel of squills, and spirit of sal ammoniac with anise seed, is of great service if given in proper quantities. If the fever decreases, and the cough is too moist, and there appears a tendency to a consumption, gentle loosening medicines repeated occasionally, to draw away the peccant matter from the breast, will be very proper, such as manna and rhubarb, and balsamics, particularly Mortons's balsamic pills. Other medicines likewise should be used to restore the tone and strength to the vessels, and preserve the patient from the scurvy, such as Peruvian bark and steel preparations, which of all others are the best. Bitters and Stomachics are likewise of great service. Thus much I think necessary to offer on catarrhous disorders; if the reader is desirous of knowing more of this subject, he must consult the authors who have written on that head.

7. It may not be improper, as I am upon these subjects, to describe another disorder,

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which is produced by the same causes with the catarrhous disease, viz. the swelling of the glands : as it often happens, that in the spring men in other respects perfectly well, are seized on a sudden with pains about the jaw, the neck and throat, with a great swelling and hardness in the glands, particularly the parotid and maxillary glands, but without any redness attending it, unless the disorder has continued for some days. It generally seizes them, after they have heated themselves by labour or dancing, or when they have indulged themselves too freely in drinking gin, and carelessly exposed themselves to the night cold, and slept in the open air, as they very frequently do. When they first wake, they find a numbness in the parts abovementioned, with a stiffness of the neck and difficulty in moving it. In this manner they get into their hammocks to warm themselves ; when they are warm, they find a pain sometimes with or without a fever, and frequently have so great a swelling that they cannot move their jaws. I have observed

*On SWELLINGS in the NECK.* 55

observed that this disorder generally breaks out about the end of the spring, and that lax and phlegmatic temperaments are most subject to it.

8. With respect to the cause of this disorder, every one knows that the parotid maxillary and sublingual glands are considered as the most important of the organs which secrete the saliva. It is very well known also, that in this internal fabrick, a great part of this fluid is secreted, and that there is a perpetual dropping of the saliva into the mouth thro' the excretory tubes, while they receive a great quantity of the arterial blood, as we may judge from the anatomical inspection of the number and diameter of the vessels going to them. Now if any one considers the slow motion of the fluids thro' them, and the tenderness of the vessels thro' which these juices flow, as well as their narrow turnings and windings, together with the nature of these fluids which tend towards contracting a glutinous lensor, he will not then wonder, if after a sudden change from extreme

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heat to cold, these and other adjacent glands of the same kind, should so frequently be swelled. For the vessels are contracted by the cold, and the fluids rendered more glutinous, and impassable, by which means the business of the secretions, and the circulation of the fluids, are either obstructed or totally suppressed, and to this perhaps the eating of barley so often, and in such quantities, may in a great measure contribute.

9. This disorder may be cured by relaxing the contracted vessels, and dissolving the glutinous fluids, which is easily performed by emollient poultices, made of bread and warm water, applied every two hours to the part affected. But great care should be taken, that they never grow cold whilst on the part; it may be of service also, to wash the mouth often with warm emollient decoction, and keep the body, particularly the head, from the cold. The drink should be small, and every thing strictly guarded against, which can accelerate the motion of the blood. This regimen should be

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continued for one or two days, but if the pains are violent at first and attended with a fever, then a vein should be opened once or twice, otherwise it is not necessary. If you find that the swelling is a little softer, drastic purging medicines often repeated are very proper, such as jallop, scammony, senna leaves, trochisci alhanda, resine of jallap, pulv. cornach. and epsom salts: then put a plaster on the part made of melilot, cummin, oxyroc. labdanum, or de ranis sine mercurio; and by this method of treatment the swellings may be very happily removed in a few days; I speak from experience, for out of a hundred cases that I have been concerned in, I scarcely recollect four who were not cured of these swellings by this simple method of treatment.

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C H A P. III.

*On the EPILEPSY.*

A NOTHER very terrible disorder, which sometimes affects the sailors whilst at home, is the Epilepsy. This gene-

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generally shews itself, whilst the ships are just fitting out, and continues whilst they are on shore. I shall therefore make some few observations on this disorder, but shall not dwell on an enquiry into the causes of it. Now it often happens, that notorious drunkards, tho' they may never have had the Epilepsy, yet sometimes in a day's time may be struck with an epileptic stroke, whilst others, tho' they never had a real stroke of the Epilepsy, pretend that they have, in order to gain their discharge more easily under this pretence. On this account, a surgeon should make it his business to examine whether the disorder be idiopathick or symptomatick, or whether it is only feigned. The real Epilepsy may easily be known by the countenance of the sick person, which is never florid ; and by enquiry likewise, whether the patient was ever affected with that disorder on shore, If every thing seems to confirm the man's having a real Epilepsy, the surgeon should acquaint the commanding officer, that he may be discharged. For as such

such men are unfit for all service, besides their being a shocking sight, they are also in the way of the others.

But those who have contracted the Epilepsy by drunkenness soon get rid of that disorder, for when they have been some weeks at sea, their stock of liquor is exhausted, and the disorder ceases. As for pretenders, I have often cured several of them very happily by the means of a lighted candle applied to the ends of their fingers. I must own I was very credulous at first with respect to this disorder: I saw two on board the *Orange-zaal*, who pretended to have this complaint, and desired the captain to dismiss them from the service. When they got on shore, they soon began to be very joyous, and confessed they never had laboured with any such disorder; on which account I have since that time been more upon my guard.

PART

## P A R T II.

*On the DISORDERS observable at Sea, or  
during the Voyage.*

MY design in this second Part, is to consider what happens to the sailors at sea, and to what disorders they are at that time most liable. And in order to explain this more clearly, I shall suppose the ship to be bound to different countries, I mean to go from a moderate climate to a warmer, and then to the hottest; or from a warm climate to a cold one, or even to the coldest. In these voyages it is necessary to consider, what disorders arising from the heat, shew themselves in the summer, either in the Spanish seas, or in the Mediterranean, or even under the Torrid Zone, and which likewise in autumn and in the coldest winter. I have therefore divided the examination of this subject into two parts. In the first, I shall treat of those disorders which are observed when the ship goes from a cold climate

climate to a warmer ; and in the other of those which occur, if the ship on the contrary goes from a warm to a cold one. But I would have it observed, that I speak only of those which happen at sea, and not in port, or in a road, unless it is very distant from the land, where sailors live in the same manner as at sea, and do not suffer from any noxious exhalations from shore.

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C H A P. I.

*When the Ship goes from a cold Climate to a warm one.*

1. **S**AILORS who go from a cold climate into a warmer generally keep free from disorders, unless the heat is very intense, as it is in some places under the Torrid Zone. Experience likewise tells us, that sailors are more healthy at sea, than in port, or in a road. Yet the contrary has been sometimes observed, viz. that the sailors have enjoyed a perfect state  
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health in port, or in a road, and that after having been a short time at sea, the whole ship's crew have taken to their hammocks, and been confined there a considerable time. For which reason it may be necessary to examine into the causes and origin of these phænomena, that we may guard against them the better for the future. And first of all, why the men are more healthy in warm climates and at sea, than in cold ones and in port, or in a road? And secondly, why this is not always the case?

2. That the sailors are more healthy who go from a cold climate to a warmer, appears from those who go in spring from their own country to the Spanish seas or the Mediterranean. For the ships when they begin their voyage, always are sure of having some sick on board with them. But after they have been some weeks at sea, and have left the British channel, and begin to feel the heat a little, the number of the sick soon begins to decrease, though before this they were very considerable. I  
always

always observed, that the invalids, as soon as they felt the heat, recovered very speedily, excepting those who were infected with any contagious distemper, or were indisposed from some manifest circumstance, which still continued to operate upon them, which I shall have occasion to say more of hereafter. I have observed this to happen not only in the ships which I sailed in myself, but likewise in those which were in the same fleet. Nor are the causes wanting, why sailors should be more healthy in warm than in cold climates. For many of the disorders to which they are liable have their rise from the cold, and from perspiration being obstructed; but as the cause in them is a remote one, the disorders are removed very easily. The weather in warm climates is likewise much more constant and mild than in cold ones, which is a very happy circumstance for seamen. On this subject see the Preface. Besides, in summer they often strip, in order to shake off their vermin, which they do not so readily chuse

chuse to do in winter. The rains also in warm climates are less frequent, by which means both the men and the ships are kept more dry; for they can bring their cloaths and hammocks upon deck, and let them lie in the open air to dry and sweeten, which there is scarcely any opportunity of doing in winter. From all these circumstances it must be sufficiently clear, that sailors in warm climates not only enjoy many advantages, and breathe a purer air, but also that they have it in their power to be more cleanly in their cloaths and hammocks, and in their very bodies, which is a circumstance that certainly contributes very much to health. For I never made a voyage, but I saw some of the crew, through want of cleanliness, or negligence about their bodies, pine away, and sicken, nay even sometimes die.

3. Sailors likewise are more healthy at sea than in any port whatsoever, and the farther the ship is from land, the better the sailors are; though some people will tell

tell us, that the men are always wonderfully refreshed, when they breathe a land air, or in that atmosphere which is near land ; it is for this reason that sailors have been said to be so unhealthy out in the ocean, because they could not breathe that same atmosphere which they do on shore ; which question I do not take upon me to decide, though I think that this opinion is by no means founded on firm principles, and that sailors are oftener prejudiced than refreshed by exhalations from the land ; for experience shews us, that they are equally, nay even more liable to disorders near shore than in the middle of the ocean, where they do not breathe such an atmosphere. It is true indeed, that when the men have been some time at sea, and come near land, they are sometimes refreshed with very grateful aromatic smells ; but all shores do not furnish quite so agreeable an odour, but sometimes instead of it the most fetid unwholesome fogs, with different parts of putrid bodies lying about, and other filth which

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the tide throws on shore, by which the nature of the air must be greatly changed, and retains nothing in the least grateful. Now the case is totally different far out in the ocean, for there are seldom any fogs seen there, and if there should, they are by no means impregnated with fœtid particles ; by which it appears, that the surface of the sea upon a given extent, does not exhale so much as the land, and if it does, that the greatest part, if not the whole of these exhalations, is watery. For it has been demonstrated, that the salts do not rise with the vapours from the sea beyond half a line, but fall back into the sea ; the watery particles are rendered weightier perhaps, and less apt to evaporate. For oftentimes when I have set out in vessels of the same size, an equal quantity of rain and sea water at one time in the sun, and another in the shade in a pair of scales, I have always observed, that in a given time, especially at the beginning, the rain water lost more, and the salt less of its weight ; but in four and twenty hours

hours or more, it exhaled nearly the same quantity, and sooner, if it was exposed to the rays of the sun. I have observed too, that sea water in proportion to the rain water exhaled less, and lost less of its weight under the torrid zone, than in our climate. *Nils Valerius* observed nearly the same thing, but with this difference in our experiments, that I did not keep the water a sufficient length of time, but that is of no consequence to the point in question. *Vid. Act. Academ. Succ. an. 1746.* It is moreover well known, that water does not exhale according to its quantity, but its superficies; and that running and deep water exhales less, than that which is stagnating and shallow. Running water exhales less on account of its continual change of place, by which means the watery particles are less exposed to the rays of the sun, and indeed are scarcely affected by them: whereas in standing water, they are constantly exposed to them, like the earth, which sucks up as it were the solar rays; from whence it happens,

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that the bottoms of lakes and rivulets are soon heated, and the water they contain, is more or less rarefied and disposed to evaporate. Besides, the plants and trees, &c. &c. send forth an immense quantity of exhalations from their very immense, superficies, which is the reason that the dew does not fall so plentifully in the ocean, as in a road, or in straits. Skilful seamen know this circumstance very well, for when they are looking out for any island, in the ocean, they discover them always, or at least in general by the small clouds which hang over them. Any person who has once seen the island of Madeira from the sea in a clear day is pretty well acquainted with this appearance ; for if he looks round, he will see the air very clear all round him, but over the island it appears grey and reddish, and directs its termination which the Dutch call *een Bank*, according to the course of the wind. However, tho' the air may possibly be infected with the bitumen, or the particles of the putrefied bodies which rise out of the sea, yet their quantity is so very

very small, that they cannot be distinguished by the smell, or any other method. On which account I believe *Mons. de Morogue* to have judged very rightly in saying, that the air which covers the surface of the sea is equally wholesome, as any that we can breathe. *Vide premier volume des Memoires présentés par les savants étrangers à l'Academie des Sciences.* This is confirmed by the English writers, who have observed, that the ships which anchor near the shore, are oftener unhealthy than those which keep at a greater distance. From whence they have not without reason concluded, that unwholesome exhalations from the earth become, when wafted at a short distance from land, perfectly innocent. Captain *Mitchel's* fleet, which anchored in the year 1747 between *South Beverland and Walchern*, has furnished us with a convincing proof of this, for they were perfectly healthy, whilst the soldiers at the same time were afflicted with a most violent contagious disorder in the places abovementioned. Although I cannot believe, that the air

in the ship is as pure as the external air, yet it is possible to let in pure air, and if not, it will necessarily insinuate itself by degrees, and though not in so great abundance as may be requisite for filling all the ship, at least it serves to correct and purify the internal air. But the case is generally quite different in harbour, where both the external and internal air is full of noxious exhalations, and in such cases letting in air is often useless, and sometimes even hurtful. Besides all this, their watches and labours are much more regular at sea than in harbour, or in a road. *Vide Preface.* And if the sailors are sometimes attacked by an enemy, or obliged to combat all kinds of wind and weather, which very seldom happens in summer, they are able to go through it with ease, and without any great detriment to their health. Those likewise who have contracted any disorders at home from drinking spirituous liquors too freely, cannot so easily hurt themselves, for their stock of liquor is soon consumed when they have been a

short

short time at sea, if not before they go out. It appears from thence pretty clearly, why the sailors should be more healthy at sea than in harbour or in a road, and why they should be better in warm climates than in cold ones. Now what has been said with respect to the Spanish Seas and the Mediterranean, holds equally good of the countries situated under the torrid zone, in which the inhabitants have rain only one fourth part of the year. This is constantly observed, as often as the ships go to these climates, unless there are other co-operating causes besides the heat, which I shall have occasion to speak of presently. I now beg leave to give an account of a voyage I made to these countries, though I could quote many, but think it superfluous, as the matter is confirmed every year beyond a possibility of doubt. In the year 1760, the *Princess Carolina* of fifty guns and three hundred men was sent out. These men before they went on this voyage had been almost a year at sea in her, and during the winter had

suffered great hardships from the cold in Holland and England, and in the British channel. In the month of March they returned to Holland, and stayed four weeks on shore to recover themselves a little. On the 4th of April they had orders to get themselves in readiness, and sailed the tenth of June the same year. The mercury in *Farenheit's* thermometer was then at sixty-two degrees in the morning, at sixty-six at noon, and at sixty-three in the evening. This thermometer was placed under the half deck in the back part of the ship, that it might not be affected by the rays of the sun. When we first went to sea, we had thirty men confined to their beds for the most part by a peripneumony, of which disorder one *Isaac Van Wymen* died the next day. His lungs were found on dissection to be gangrened. On the third of July we came to an anchor at the island of Madeira. The weather in this voyage was cloudy and rainy, and the wind changeable, but chiefly at north. The mercury in the thermometer that day  
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at seven in the morning was at seventy-two degrees, at four in the afternoon at seventy-five, at eight in the evening at seventy-four; and now the number was reduced to twelve. The first day of August we came to the island of *St. Eustacia*. The sky was very serene, and the wind was chiefly at east all the time. The mercury in the thermometer was then at seven in the morning at eighty-two degrees, at twelve at eighty-four, at four in the afternoon at eighty-four, at eight in the evening at eighty-three, and then the number of sick on board was reduced to six, but they did not keep their beds. The eleventh day of the same month we made for the island of Curacoa; the degrees of heat were the same, and then there were only three sick on board. Our commander ordered a little rum to be given every day to the men. On the 19th we entered the harbour of Curacao; the mercury in the thermometer was that day at seven in the morning at eighty-three degrees, at twelve at eighty-four, at four in the afternoon

at

at eighty-four, at eight in the evening at eighty-four, and then we had twenty sick on board, amongst whom some had pains in their head without a fever, and some a bilious cholic, but were all easily cured. On the 25th the number of sick on board was reduced to seven. The mercury in the thermometer at seven in the morning was at eighty-five degrees, at twelve at eighty-six, at four in the afternoon at eighty-seven, at eight at eighty-five. The sky was then very serene, but many of the men were troubled with prickly heats, which in these countries are very troublesome, though they can hardly be called a disorder. Excepting this circumstance, they were all perfectly in health. The reader will find more said upon this subject in the third part of this Treatise, where I take notice of the disorders which generally prevail in harbour. The sailors, during the time that we sailed from Holland to the island of Madeira, lived in their usual manner, and then had once or twice, from the generosity of the captain, a dinner given

given them of fresh meat and vegetables, which we call *Poefpas*. Between the island of *Madeira* and *St. Eustatia* they received from the same kind hand some onions to be added to their pease. All through the voyage the port holes were kept open as much as possible, and the air sails hung up: but at the island of *Madeira*, our captain was cautioned not to let the men be exposed to the cold at night, to have the port holes shut, and the air sails let down, so as to let only the hatchways be open. He ordered the men likewise, who were not upon watch, to remain below, by which means the heat at night between decks was almost insupportable.

On the 20th, 21st, 2d, 3d, 4th of July, we were about 19 and 18 latitud. merid. 334 long. I hung the thermometer between decks, that I might calculate the difference at night between the heat of the atmosphere, and the internal part of the ship. The first night between eleven and twelve, the mercury in the open air was at seventy-seven degrees, between decks

decks at eighty-three. The second in the open air at seventy-eight, between decks at eighty-four. The third and fourth in the open air at seventy-nine, between decks at eighty-five. The last day at the same hour at eighty-one, in the ship at eighty-six and a half. But this extreme caution with respect to the cold not only increased the heat between decks very greatly, but likewise confined the exhalations from the water as well as from the men, who were at least one hundred and eighty in number, and prevented them from being carried off. For when I went down between decks to observe the thermometer, I could scarcely stay there two minutes without being in a violent sweat, or any one that happened to go along with me. I saw many of the men lying naked upon their chests or upon the floor, all of whom were in a profuse sweat, some sleeping, others throwing themselves about, some disturbed in their sleep, and frequently sighing most grievously, others saying that they absolutely

lutely could not remain any longer in the ship. And tho' I made a shift to stay there a little while it was extremely disagreeable. I thought it proper therefore to acquaint our captain with this, and shewed him the necessity of opening some of the port holes, and in consequence, two of the stern ports were accordingly opened. When this was done, the winds which in these countries, or under the tropic of cancer, blow upon the back part of the ship when going westward, drove the air contained between decks towards the hatchways in the fore part of the ship, by which means the men slept better, bore the heat more easily than before, and continued in good health.

4. Having explained the reasons, why sailors are more healthy at sea than in port, and why hot climates agree better with them than cold ones, I shall now consider why this is not always the case, and to what causes their ill health is to be ascribed ; for it sometimes happens, that a whole ships company shall enjoy a good state of health in harbour, and on the contrary,

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be very unhealthy at sea. In order to explain this, two things are first to be examined into in general; 1st, what are the causes which are capable of producing a general havock; 2dly, from whence it arises, that if two or more ships which go out from the same place, the one shall be healthy, and the other not. Now the causes which are capable of producing a general disorder, and affecting a whole fleet, are for the most part these: windy and continually rainy weather, which forces the sailors to keep the different parts of the ship shut up, which, tho' it does not frequently happen in warm climates, yet when it does, an effect, directly contrary to that in the two preceding sections, naturally results from it. For the good and healthy seamen are too much fatigued, while the others either dare not or cannot go upon deck, by which means the number of men between decks is unusually increased, and the exhalations in consequence greatly augmented. Besides this, if those who keep watch should be wetted

ted by the rain, or be obliged to bring up their hammocks upon deck, by which they likewise are wetted, when their watch is over, they go with their wet cloaths into their wet hammocks, and dry them with the warmth of their bodies. And this is another cause, which contributes greatly to infect the air contained in the ship. Moreover the rains that fall, or the waves which are dashed against the ship, frequently will penetrate thro' the hatchways and crevices into the ship, and wet the floor and beds which lye under them. Besides the port-holes, and those holes which are next to the upper deck, and are made on purpose to let out the water into the sea, commonly called scopper-holes, cannot be so tightly closed, but they must let in a very great quantity of water. And though a scopper leather is hung over those holes on the outside, to prevent the waters coming in, yet by the different direction which they sometimes take, they do notwithstanding let some of it in frequently. It very often happens too, that these

these scopper leathers are worn out, and rendered unfit for the purpose they were to serve. However, it is no great matter which way the water comes in ; but it certainly does so by some means or other every time it is rainy or windy weather, and lies upon the upper deck, from whence, as often as the ship rolls by the wind or the sea, from one side to the other, the water consequently moves with it, which furnishes a third reason for the air being impregnated with exhalations. Lastly, if we consider the exhalations which arises from the well, the hold, and the lower deck, from the provisions which are placed there, and the casks which are not shut close, whose water, whether from rain or river, by the putrifying insects contained in it, increases the natural stench of the ship, as likewise from the cables and numerous other things, the exhalations from the sick on board, and divers other circumstances, which must naturally arise from such a number of men confined together within so small a compass ; if we consider

consider, I say, all these, and the necessity which men are in of breathing a pure air for the preservation of life and health, it will readily appear, that such an hot atmosphere, so impregnated and saturated with putrid particles and watery vapours, must be very detrimental to the health of those who are obliged to live in it: from hence proceed diarrhoeas, dysenteries, and various kinds of putrid and malignant fevers, which I shall treat of in the third part of this Treatise, where I speak of the disorders most prevalent in harbour. For it is well known, that there is nothing in the nature of things that contributes more to diseases, or is more likely to produce putrefaction, than a moist and hot air, especially if it is impregnated with different fætid particles, as the air in ships is. See an excellent Treatise on this subject, which Mons. de Morogue has published, *dans le premier volume des memoires présentés par les savants étrangers à l'académie des sciences*, where he examines the state of the air very accurately; or a little Treatise

tise by Mons. du Hamel du Monceau *Moyen de conserver la santé des equipages*, which the learned *Lutjfs* has translated into Dutch; likewise *Lind*, in his little Treatise, which is translated into Dutch by *de Wind*, *Means to preserve health*. With respect to the effect which such a foul air must produce in the body, consult the histories of epidemical disorders published by *Hoffman*, *Huxham* and *Pringle*, and those which Mons. de Monchy has given in the *Haarlem Transactions*. It is needless for me to say any more on this subject, it is sufficient to have pointed it out, but shall only mention some few things relating to it hereafter.

5. Now the particular causes which affect only one ship, when the others tho' in the same climate escape free from disorders are numberless. Sometimes they are known pretty easily, and sometimes with great difficulty, particularly if many trifling causes co-operate, and those by degrees are rendered more efficacious. These are very frequently added to the general ones, and at last become very powerful.

powerful. For though a fleet consisting of many ships may be affected by one general cause, yet the whole can by no means be equally affected, but some of the ships will happily enough escape the epidemic disorder, whilst the others, if they are at the same time affected by some particular causes, may be terribly afflicted. But as the number of these causes is very great, I believe the reader will be satisfied, if I take notice of the principal ones. I mentioned something above concerning a ship, but ships differ from each other very greatly, though they are of the same rate, structure, and management.

1. The structure differs, and is prejudicial to health, if the space between decks is lower than it ought to be; for in one ship the first and second decks are perhaps six foot distant, in another five or thereabouts. I never measured them exactly, and therefore have perhaps mistaken two or three inches, but that is not very material, as the number of men who occupy that part, is the same. If the number of

chests in this place, is greater than it ought to be, or if such things are put into it, such as casks, balks, &c. &c. which in some ships are put down into the hold ; all this contribute to lessen the quantity of air, which was before already too little. .

2. If the gratings are not large enough, or not sufficiently lengthened behind the main mast, or are blocked up by any incumbrances whatever, as is the case in many ships, so that the exhalations cannot evaporate, they contribute greatly to the sickness on board.

3. If the ship takes in water too easily, by which means the upper deck is frequently wet, whatever way it comes in.

4. If the port-holes are too low, so that they cannot be opened without letting in the water.

5. If the ship is new, and the wood too damp.

6. If the men cannot be conveniently placed between decks about the sides of the ship, so that a great number are obliged to lie under the hatchways ; or if they  
are

are not allowed room enough, so that the able sailors drive out the weak and ignorant ones from their places, and oblige them to lie upon the floor, where they not only endure great hardships, but also lose their bedding and cloaths by their being soon filled with vermin, by which means they shortly become diseased, and the whole crew perhaps is confined to their hammocks.

7. If the principal officers suffer the men who are unaccustomed to the sea, and inclined to be lazy, to live as they please, and do not frequently inspect their conduct, to see that their hammocks are in a proper place, and in that which was assigned to them; whether the men have kept their proper hammocks and cloaths, as they very often sell them, and whether they keep themselves clean and free from vermin. The officers indeed endeavour sometimes, when the men are very dirty and prejudice their health by their filthiness, to cure them by an inch rope, but too late, for in that state their life is sooner beat out.

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them than their disorders; and therefore it were to be wished, that such matters were timely inspected into.

8. If the lazy and inexperienced seamen are not duly encouraged to work by the officers, or if the good sailors together with the others are over-burthened, which is often the case.

9. If the old or inexperienced men are continually harrassed and frightened by the severity of their officers, or if the under officers exercise too great an authority over them, beating them for the least occasion, for instance when they will buy no liquor of them. *Vide Preface.* On the other hand, if they have too much liberty to live as they please, nothing can be more detrimental to their health, or more productive of disorders.

10. If the whole ship's company is unnecessarily exposed to the wet; for instance, if two hundred are employed when thirty could do it as well, since it would certainly be better for thirty or forty to be wetted, than for the whole ship's company.

11. If

11. If the place between decks is not kept properly clean, and tho' cleaned, if the chests are not moved out of their places, by which means all the holes and corners are not cleaned out, and the places under the guns are not swept, but only what is immediately under foot is brushed. And if, when the floor is cleaned, they wet it first, while it had better be only scraped and not wetted at all.

12. If the port-holes are not opened at proper times, but are kept shut for a day or two together, when they might very well be opened; or else, if they open them improperly when the sea is too boisterous, so that the water gets and wets the whole floor, before they shut them up again.

13. It is a very prudent step in the sailors, in dry clear days, to set out their hammocks in the open air and the sun, to sweaten and purify them, and dry them if they are wet; nor should they ever be covered by the sails, but exposed entirely to the open air. In the mean time, the proper officers should be careful, if they

see rain coming, to order them to take in their hammocks. These circumstances contribute very much to the keeping the place between decks clean. *Capt. P. V. Hogerwerff*, in the last voyage I made, ordered those who kept watch in clear days to bring their hammocks upon deck, and cover one side of the ship with them. When they had finished their watch, they were obliged to carry them down again, by which means they were not only every day set out to sweeten in the air, but also the place where they hung was more commodiously cleaned out. This seemed a very hard task at first, but in a short time they were so accustomed to it, that in a few months they did it of their own accord. And it is very certain, that if it is seldom or never done, it must be very prejudicial to the health.

14. If the petty officers or sick have private conveniences for their occasions which they use at night; or if there have been many women in the ship whilst they were at home, for they will generally foul every

every private corner; and those places are not well cleaned out after they are gone away; or if in the voyage the hold is used for these purposes by the men, the air is always greatly tainted.

15. If the air sails are not hung up often enough, by which the air is communicated into the lower deck or hold, and the air already there is not purified, which is not only prejudicial to health, but is hurtful to the provisions.

16. The provisions likewise change very much, and that in very different ways: if they were put on board as good, and are found to be otherwise, nay, even if they are but slightly tainted they are very hurtful, for they can but barely be kept good, when put in so, how then should they be good, if before they were shipped they were already tainted?

17. If the provisions were good when they were put into the ship, but have been spoiled, by being kept too damp and hot; or if, by the air in the hold not being sufficiently purified, they have been tainted,

tainted, and lost their goodness by fermentation. Hence it is, that the pease and bread grow mouldy, and the barley in the casks is covered with a crust, which, tho' it cannot be totally avoided, happens much more frequently in one ship than another. In a voyage which I made to the West-Indies, I put one of Drebbelius's thermometers into the hold, and hung it there by a packthread till the liquor in it did not stir; then putting the bulb of the thermometer into a cask of barley or pease, I found a great difference of heat, but that it was much less when the air fails were up. But when I put Fahrenheit's thermometer into the barley, I found a difference of seven, and sometimes nine degrees from the external heat. The pease were not so hot, and the mercury rose scarcely above three or four degrees of Fahrenheit's scale. The pease and barley, on which I tried the experiment, were very dry and good.

18. If the provisions were already filled with animalcula, or if the ship was not well

well cleaned out, before they were put in, so that the seeds of the insects which were concealed in the wood and crevices, tainted the provisions in the ship. If there is a great quantity of them, they will frequently consume the best provisions, and create a disgust in the people, and may possibly likewise give them many disorders. Not but that I have made a voyage, in which I saw an innumerable quantity of them in all our provisions, and yet, excepting the men being disgusted, no other bad consequence happened.

19. The provisions likewise differ very much according to the manner of their being dressed, and that depends, 1st, on the goodness and nature of the provisions themselves; and 2dly, on the water in which they are dressed; which either contains salt, or aluminous particles, or is pure river, rain, or spring water. The pease should be boiled in pure water, but it is not so necessary for the barley; for I have often seen, without any bad consequences attending it, two parts spring or river

river water, and one part salt put in to dress it; and if water is scarce, they take an equal quantity of each, but then the barley is bitter and salt; if they put in only a third part it tastes pretty well, but is not so good as when boiled in fresh water. 3dly, On the care and exactness of the officers, for if they are regular in examining the provisions, the cooks are more diligent and cleanly, especially if they sometimes go into the kitchen, and take care that it is kept in proper order. Lastly, if the men eat with their grey pease that sauce which they call *smeer*, which is composed of fat that is generally rancid or nearly so, and thus may easily taint whatever it meets with in the primæ viæ.

20. Tho' the provisions are in themselves good, yet if the men eat too voraciously of them, particularly in the warmer climates, they very seldom agree. Dr: Lind gives an instance of this on board the ship the *Sheerneſſ*, *Capt. Hogerwerff*, in a voyage to the island of Curacao, was rather sparing in dieting his men, and found the good

good effects of it, tho' he was on all other occasions a very generous commander. In our last voyage to the Mediterranean, he pursued the same method with equal success. The reason is very obvious: in warm climates the men are not so hungry as in cold ones, and the organs of digestion are much weaker; if therefore they are loaded, disorders may very naturally be the consequence. But though it is not easy to measure the proportionate quantity of food for so many different stomachs, yet it will be very useful to pay a proper regard to this matter. On this account, in warm climates and fickle times, the sailors should be debarred from those provisions, which are esteemed most detrimental, and be dieted with more innocent food, as was done on board an English ship, where their salt provisions were taken from them, and that even without any complaint.

21. If they do not use the pumps often enough, and keep the ship quite clean, especially if the weather is very calm.

If

If the ship is tossed about by the winds and the sea, there is no need of letting any water in, for at those times so much water comes in through the crevices, that they are even obliged, twice or thrice in a day, to pump it out; but in calm weather, if they do not renew, the water frequently will in a very few days putrify, and give a most horrible stench. The blackness of the water is not however to be regarded, as that is attended with no pernicious consequences, but only its fœtid smell; for any one, who knows how ink is made, and knows likewise that a ship is principally composed of oak and iron, he will very soon account for this blackness.

22. If the stinking water is drunk by the men too soon, I mean, before it has stood some hours in the air, in such kind of casks as they generally have to pour the water into for daily use, that by being exposed to the open air it may lose most of its stench. But tho' the water in all ships is tainted, yet it does not smell  
equally

equally fætid in all, on account of the difference of the water or cleanliness of the casks ; but when it does stink, it is necessary to set it out in the air before the men drink it, that by these means it may be rendered less prejudicial.

23. If many of the men lie below in the hold, this manner of placing them is not only hurtful to the men by their breathing a very foul air, but also by their continuing so constantly in it ; by which means they heat the air, and impregnate it with the exhalations which arise from their bodies ; and what is worse, they are guilty oftentimes in those places of such nastiness, as they would not dare to do between decks ; and thus not only hurt their own health, but likewise greatly contribute to the speedier spoiling of the provisions.

24. Lastly, the men are prejudiced in their health by contagious disorders, which may be called either their own or adventitious. What I mean by adventitious is, if they receive it from any boats with the infec-

infection among them, plying or hovering about them, or by any men from other ships, or from shore, with the seeds of infectious disorders, although they appear in health when taken on board. Dr. Lind mentions a case of that sort; two Englishmen out of a Dutch ship, which came from the West-Indies and stopped at the Isle of Wight or at Spithead, entered themselves on board an English ship, in which they had scarcely been one day, although they had appeared in health, but one of them was found dead in the morning, and the other confined with a bad fever which infected the fleet. But what may be called their own contagion is, if there are a great many old lazy fellows in the ship's company, who are unable to live a sailor's life, and by having the seeds of some disorders in them are laid up on the slightest occasion. If likewise they have a great number of sick on board, though the disorders which they labour under are not contagious. But if at such times the air between decks is not well purified, the sick and the healthy

healthy kept separate, cleanliness preserved as much as possible amongst the sick, the close-stools emptied immediately, instead of leaving them a day and a night to infect the air ; if, I say, at such times the greatest caution is not used, the slightest disorders will breed the worst of contagions. With respect to disorders contagious in their nature, I think there is no necessity of enlarging upon them.

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## C H A P. II.

*When a ship goes from a warm climate to a cold one.*

**I**T will be necessary in this place to remember what was said in the preceding chapter, and in the Preface ; and it will readily appear, that many things which were said, with respect to the Summer and the heat, will be quite the reverse in Autumn and Winter : which shews that the Summer is favourable to seamen, but that Autumn and Winter are prejudicial. But

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as a ship cannot come out of a warmer climate into a cold one without an intermediate space, it must be liable to autumnal disorders. But before I treat of those disorders which arise from the severity of the cold, I shall take notice of the autumnal disorders which generally occur at sea. If it does not freeze all the winter, and the winter is pretty nearly like autumn or the end of summer, warm and rainy, like the winter under the torrid zone, or like what is still oftener observed in autumn, in the Spanish seas or the Mediterranean, it then may, in reference to disorders, be considered as a long autumn, or a moist summer. But if it freezes sometimes, and rains, and hails, and snows, as it often does in the Mediterranean and Spanish seas, and sometimes the British channel or the German ocean, then, besides the heat being changed into cold, a change of disorders is likewise observable, which appear in a different way to what they do in a warm and moist climate. Different species of fevers then occur at these

these times, which I shall treat of in the third part of this Treatise, as well as rheumatisms, scurvy, diarrhæas, and dysenteries, which will be separately taken notice of. But if the frost is very severe, it either changes the disorders which prevail in autumn, or stops their progress, or produces others, which will be mentioned at the end of this chapter.

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S E C T. I.

*On the RHEUMATISM.*

**F**requent changes of weather, heat by day, and cold at night (which circumstances peculiarly distinguish autumn) render seamen liable to various disorders; who by the very dry and hard food which they eat, and which resists the powers of nature, and the action of the vessels, before it is reduced in them to the last stage of perfection, not only collect many heterogeneous particles in the body or mass of fluids, but are often also by their

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duty obliged to expose their bodies rendered extremely accustomed to perspiration, by the preceding summer and daily autumnal heats, to the nocturnal cold and rains, tho' oftentimes in a violent sweat, and even with very few cloaths on, by which the greatest evacuation of the skin is oftentimes quite suddenly either greatly diminished, or totally suppressed; from whence the accumulation of many sharp humours in the body, the greatest cause of disorders, and the material cause of Rheumatisms, has its rise. These humours, so long as the body retains its due tone and strength, and nothing interferes to disturb this most wholesome evacuation, are expelled by degrees from the body, and are not pernicious; but if they are retained and mixed with the circulating fluids, they disorder the whole body. But if they are carried to a part which is ready to receive any morbid matter, they irritate the part, and create pain in it, and an inflammation is frequently the consequence, by which, according to the part where

where the matter lodges, the different species of disorders are formed. For instance, if the teeth are affected, it is called the tooth-ach ; if the breast, a bastard pleurisy ; if the arm, a rheumatism, &c. &c. But as this disorder has nothing peculiar to it on board from what is observed on shore, I chuse rather to refer the reader to the writers on that subject, than dwell longer on the description of it. I shall only mention some circumstances respecting the cure ; and here it will be very necessary to examine, whether the patients have too much blood, or have a bad habit of body, for opening a vein will be as serviceable to the former, as it is detrimental to the latter. In the same manner with regard to weakly people, phlebotomy should be very sparingly used, for besides the natural tendency which they have to the scurvy, this prepares the way for it. But if by the common method of treatment and gentle diaphoretics sometimes repeated no alteration takes place, Peruvian bark is to be given, and large blisters put

to the affected part, particularly if the cold is a little severe: for then no great good can be expected from gentle diaphoretics, as the men are generally deficient in cloaths and coverings. Where the patient is young and hearty and full of blood, hot and strong sudorificks are oftentimes more hurtful than serviceable. Besides this, I have often remarked, that small blisters rather irritated the disorder, when large ones have often been found to be of great service. Last of all, great care should be taken that the robust and hearty men should not be too much weakened, nor the weak and sickly made more liable to the scurvy, on which account it will be proper that the sick do not lie long in their hammocks, or be not kept too long below, but if they can, that they be got up, and walk in the day-time upon deck, in the open air, or exercise themselves in any other way. Unless they do this, they stand but little chance of escaping the scurvy.

i. Doctor Lind, in his Treatise on the Scurvy published in England, has given a  
most

most accurate account of this disorder to which sailors are particularly subject : it is a book of the first character, and ought to be attentively read by every one who is desirous of practising physic or surgery at sea ; on which account I make no scruple of referring my courteous reader to the work itself, and for brevity's sake, chuse to omit in this Treatise of mine several things mentioned in his, tho' perhaps they might contribute to a more perfect knowledge of the history of the disorder. As I think it a matter of very little consequence whether the antients were acquainted with this distemper or not, I shall not dwell upon, or indeed at all concern myself with the disputes on that subject, which the English physician has given us an account of ; but shall think it fully sufficient, if in the course of this work I explain so much of the history of this disorder, as generally occurs in our men of war, and collect into one point of view, what obseruations I have been able to make from patients afflicted with the Scur-

vy, and from dissections of such as have died of this disease. And in this disquisition I shall observe the following order. I shall first treat on the several causes of this distemper. 2dly, On its diagnostick signs. 3dly, On the observations upon the blood of scorbutic patients. 4thly, On the dissections of their bodies. 5thly, On the symptoms. 6thly, On the nature of the disorder; and lastly, on the cure and method of treatment.

2. It seems pretty evident that more causes than one contribute to the Scurvy, which may very properly be ranked under the title of predisposing and occasional causes; amongst the predisposing we may justly reckon the following; a habit of body tending towards getting this disorder; sailors general food, which is dry and difficult to digest, to which may be added their sedentary, and for the most part inactive life; the too frequent use of tobacco, whether in chewing or smoaking it; immoderate drinking of spirituous liquors: and last of all, the impossibility of being

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supplied with fresh vegetables. Amongst the occasional causes we may reckon every thing which contributes to the lessening and suppressing of perspiration, such as cold, grief and damp air. I now proceed to the particular examination of each of these several causes.

3. Amongst all the different habits of body which are observable in mankind, none is so apt to contract the Scurvy as that wherein the blood is glutinous, fizy, thick, and heavy. For every one will allow, that a free and easy circulation of the blood is so essential to life and health, that without it the former cannot be preserved for any length of time without manifest difficulty, and the latter cannot in any degree subsist. From thence it appears, that such a fizy and glutinous state of the blood stops the motion of the humours, and renders it incapable of being circulated properly. On this account it is that you always find a slow and languid pulse in those who are of this habit of body, with a coldness of the extremities; so much so,

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that where these circumstances are not found, the Scurvy never appears, which will be more clearly explained hereafter. Upon the same account it is, that the ultimate concoctions of the humours, according to the laws of nature, cannot be formed; and that the secretions and excretions are carried on in a less perfect degree: by which many heterogeneous particles are collected in the blood, and obstructions of the lungs and abdominal viscera frequently arise. It is not therefore much to be wondered at, that some authors should assert, as it appears they do from their writings, that there is so great an affinity between the atrabilious habit of body, and the Hypochondriac disorder, and the Scurvy. *Vide Dolæi med. theor. pract. Encyclop. de scorbuto.* Others have considered this disorder as the worst stage of the Hypochondriac disease, as *Rivarius in prax. med. de scorbut. affectione Et-muller in colleg. pract. part. 2. cap. ult.* and many others. But *Eugalenus*, not without some shew of reason, imagined, that the internal

nal cause of this disorder proceeded from an exuberance of the melancholic humours; for though they are different disorders, yet they have many similar circumstances attending them; for besides the external signs, the blood of scorbutic patients is found to be black, sify and thick, of which more hereafter. *Aretæus* has very properly taken notice of this circumstance, when he says, *the blood in melancholic people, is thick, bilious, congealed, black, like mud,* &c. *Lib. 1. de curat. morb. diuturn.* cap. 5. pag. 124. If moreover we recollect how great a tendency melancholic, hypochondriac people have to this disorder, how easily old men are affected by it, and in short all who from any cause have such a bad habit of body, and an obstruction of the viscera, we shall not scruple to acknowledge how much the Scurvy depends on such a disposition of the body; nor do I remember to have seen such a man in our ships, who if the other causes co-operated ever failed to contract the Scurvy.

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4. We come now to consider the general food of the sailors, which from its being dry, hard, and difficult of digestion, must contribute much to this depravity of the humours, particularly if it happens to be spoiled ; but as there are many who go to sea, and use it, and yet remain free from the Scurvy, I think it necessary, before I give my judgment on these matters, to consider and examine the nature of the food which sailors generally live upon, and which in every voyage I have made has been their constant fare ; and see how far the daily use of such provisions may affect their constitutions. And as the greatest part of the food which the sailors eat is of the farinaceous kind, and as no other could serve the purposes of use and convenience better, I shall confine myself in this disquisition to the nature and properties of that. Amongst the farinaceous diet we generally reckon biscuit, pearl barley, rice, and millet, and beans ; these being all bruised small and reduced to flour, and moistened, when laid up in a warm place,

place, are fermented and grow sour. When dressed and chewed, and mixed with the saliva and water, put into a bladder, and dipped into water of the heat of ninety and a hundred degrees of Fahrenheit's thermometer, they grow acid sooner than before : for in the space of some hours the bladder being opened, the inclosed materials began to give a subacid smell ; but in twenty-four hours the smell was not only sour and unpleasant, particularly the pease, but I could easily discover by my taste the acidity of the contents, which nevertheless had not lost their toughness, particularly the barley. But as it is impossible to dissolve our food in the manner it is done in our bodies, where the dissolving juices act together with a proper motion, and the natural heat upon our aliments. And as we are entirely unacquainted with those changes which the food undergoes before it mixes with our blood, and in what manner it undergoes them ; on this account we can only judge by a similitude of circumstances and observation,

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or by those proofs which we gain from experience. Now experience tells us, that as often as any one eats his fill, for instance, of barley broth, he will generally feel a disagreeable sensation, not only in his stomach but in his whole body ; as for instance, a difficulty in breathing, and a tendency to sleeping, which he will not get rid of very soon, unless his body is very robust, and accustomed to labour. It is very well known likewise, that all farinaceous unfermented food, when mixed with water, makes the juices viscous, thick and glutinous. From these circumstances we may conclude, that such provisions in a certain degree contribute to this disorder, by thickening the fluids ; and because in the Scurvy, especially at the beginning, the blood is found to be very thick and glutinous, it appears, that by such food if it is frequently eaten, a way is opened to such a disposition of the fluids. There is another kind of food, which is dried fish, called stockfish, which is not easily digested, and remains very long in the

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primæ viæ, if it is not properly dressed. Fish in general easily tends to putrefaction, but yet much less so when dried than fresh. There is likewise but very little nourishment in them, and our sailors are not remarkably fond of them. But I rather doubt whether they contribute greatly to this disorder : considering them as a diet of the hardest nature to digest, and of long concoction, which by its lodging too long in the primæ viæ, debilitates the powers of digestion, I must pronounce them in some measure detrimental ; but on the contrary, when moderately used, and as the greatest part of them remain undissolved, and as thrown off from the body with the gross excrements, they can scarcely do any good or harm, at least with respect to the Scurvy. Yet some have believed that they were one cause, why the Dutch were less affected with the Scurvy than the English, who eat more flesh than they do. *Vid. Wind's Observations on the means of preserving health, pag. 99.* and *Mead's historical account of a new method for extracting*

*extracting the foul air out of ships, &c. pag. 111;* who attributes this effect less to the fish, than to the eating of oranges and lemons. I rather think the difference consists in this that the Dutch do not eat salted provisions, and live upon more innocent food as barley and bread. In the third class of provisions which sailors live upon may be ranked cheese, butter and bacon. Cheese, if it is new, causes a lentor in the juices ; if it is old, putrefies and contracts a very great alcalescent acrimony. It sometimes happens too, that it has too much salt in it, by which means, if it is too old, it very often contracts so great an acrimony, that in those who eat too much of it, it will frequently produce an inflammation of the palate, tongue, throat, and gums, the aphthæ, and ulcers of the tongue and gums, together with a great spitting, by its irritating and stimulating nature. Butter, if it is not very strong, is very wholesome, but cannot be kept a great while, particularly in warm climates, without being rancid ; for although at the  
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beginning of the voyage it will hold very good, yet at the end it will turn out very rancid and foul. From these circumstances it appears, that such provisions, by tainting the mass of fluids, with their acrid and rancid particles, must be very prejudicial to those, who have a tendency towards the Scurvy; and if they already have it, and continue this diet, how soon this disorder will arrive at its last stage. What I have said with respect to butter, holds equally good with respect to lard, and all other kind of fat, altho' in the voyages which I have made, I almost always found all the provisions hold good, excepting the butter. Sometimes indeed we found worms and other insects in the bread, the pease, the barley, and the fish. But when they were picked out, I did not find, when these provisions were dressed, that they had a more disagreeable taste than before, nor did I observe that they produced any bad consequences. *Vide cap. 1. part 2. § 5. numb. 18.* Indeed this will often happen, when the provisions are quite sweet and

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good. We find from eating these provisions every day, that they are not productive of so many disorders; for they are eaten by many people, who live in general upon them, and yet continue in good health, are strong and hearty, arrive at an advanced age, and never shew any signs of the Scurvy. It would be easy to produce numberless examples of this. In some of the provinces of Germany, the common people in general live on different sorts of farinaceous food unfermented, which they call *knofflen* or *nudlen*, and are, in heaviness and viscidity, like English puddings. I said in general, for in winter-time they usually eat pulse, as peas and beans, &c. &c. with bacon. If then we except pickled cabbage, called *sawerkraut* and fresh bread, there will be no great difference between their diet and that of the sailors. In these provinces, indeed, they have an opportunity of getting at fresh vegetables, such as *boorcole*, which however is but seldom the case; for in those countries the winter is very severe,

vere, and they are frequently covered with snow. I am not ignorant that it may be objected here, that these men use very laborious exercise, and that they live on shore, and not on board of ship; but this makes little difference, since the provisions are the same; and if they contributed so much to the Scurvy, it would naturally follow, that they should often have it, whereas that scarcely happens twice in a century. One may often see some such thing on board of ship, particularly in those men, who are called by the Dutch, good sailors; for they will not only for a certain time remain free from the Scurvy, but very often, for the space of one or two years, tho' they live upon the same provisions, and in the same quarters where a number of old inactive, and unhealthy men, are grievously afflicted. They have likewise believed, that the Dutch are less troubled with the Scurvy than the English, owing to the pickled cabbage, which they eat on board their ships. *Vide Crameri epist. de scorbuto.* With respect to myself,

I could never observe this, for in the voyages which I made, cabbage was never given to the men. Indeed I have seen the officers eat them sometimes, but never remember to have seen the sailors. From whence it should appear, that the difference depends rather upon the abovementioned cause, namely, the salted provisions. But there have been times, and those of pretty long continuance, during which, they have eaten those provisions, and yet not had the Scurvy, as may be seen in Dr. Lind; from whence it may be inferred, that the Scurvy does not depend so much on the diet of the sailors; nor is the difference of the frequency of this disorder, between the English and Dutch to be deduced from that, but from some other intervening cause. But why are good sailors in our ships less liable to the Scurvy, than bad ones? I believe it arises from hence, that they know better than the inexperienced ones, how to keep their cloaths and coverings, which these either sell or lose. Then, if they have nothing to do,

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your good sailors will play and dance together for the sake of exercise, whilst the lazy fellows had rather go to sleep.

5. From what has been premised, it begins to appear, how much exercise contributes to the preservation of health, and how much they stand in need of it, who live on heavy provisions; as every one knows that such food, to be well digested, requires strong exercise. As it is manifest, that by the motion of the muscles, the circulation of the blood is accelerated, and the heat of the body increased; so likewise it follows, that exercise, not only contributes to the quicker circulation of the blood, but to a more exact elaboration of the humours, and a more plentiful perspiration; for the greater the force is, with which the blood is driven into the vessels from the heart, so much the greater is the attrition of the fluids, as well amongst themselves as at the fides of the yessels, into which they flow; and by being sooner forced through the lesser vessels, they are thus resolved, and attenuated and ren-

dered more fit for secretions and excretions. By which means that insensible perspiration, which, according to Sanctorius's account, is the greatest of all evacuations, is considerably increased ; for by this single evacuation, in one day more of the fluids are carried out of the body, than by all the other excretions. Wherefore we may conclude, that whatever increases the circulation of the blood, increases likewise this most wholesome evacuation, and so on the contrary. From hence it appears, how much exercise contributes to the preservation of sailors healths ; and of how great service it is in hindering the Scurvy, is demonstrated by numberless examples. For we have seen above, that good sailors can remain at sea a considerable time without having the Scurvy. Dr. Lind has observed, that in the English ships, not only the superior, but also the petty officers, seldom have the Scurvy. But in our ships, not only all the officers are free from this disorder, but even those who ply the oar, though their hammocks

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hang without distinction in the ship, and they use the same provisions as the other sailors without any difference: Dr. Lind imagined, the reason why the petty officers were less affected with this disorder, than the sailors themselves, or the marines, to be on account of a curtain which is drawn round their bed, and from their coverings, or because they drink spirituous liquors more than the others. I rather believe, that in the Dutch ships, it depends on the exercise and the more frequent eating of fresh vegetables. For it is very well known to every one conversant in sailing, that the rowers endure much more labour, than the sailors or marines, particularly if the ship is come to an anchor. I have seen sailors in one voyage grievously afflicted with the Scurvy, and after their voyage recover their health at home; but, when after an interval of some months, they have gone to sea again in the capacity of rowers, though the causes have been more likely to produce that disorder than in the first voyage, yet they have not con-

tracted the Scurvy. Besides these, we seldom see the lads or boys, who love playing about, troubled with the Scurvy; tho' sometimes, one or two of them may have it, yet it may be ascribed to particular circumstances, of keeping themselves in their hammocks, or without exercise. I have moreover observed very often, that in autumn and winter, when there has been a good deal of rain, with little or moderate wind, that many have had the Scurvy, and that the disorder gained ground very fast, but on the other hand, *cæteris paribus*, when the wind was violent and stormy, and agitated the ship much, that the sailors were not so liable to be seized with the Scurvy, and that the symptoms in those who already had it were not so violent. As to those high winds which may threaten danger, I shall say nothing of them, as they seldom happen, and may produce a very different effect. It has been observed likewise, that the marines are more afflited with this disorder than the sailors, and that more die of it, of which there  
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is a remarkable instance in Anson's voyage; that the Scurvy was not so fatal to the sailors as to the military, for on board the *Centurion*, out of fifty invalids, four only survived, and out of seventy-nine marines, there remained only eleven alive, all the rest died of the Scurvy.

I always observed, in our ships, that if there were seven who had the Scurvy, that at least four of these were marines, altho' the number of marines was much less than that of sailors; and this I could never acribe to any other cause than their want of exercise. It is really astonishing, to see how great an aversion they naturally have to labour and exercise, how much they dislike all kinds of sports, affecting something grave and manly, as if it was unbecoming a soldier to dance or play. Cramer likewise has told us, that this disorder raged more amongst the foot than the horse, in the Emperors army near *Temeswar*, which was, perhaps, principally owing to their inactive way of life. Those who know how the foot soldiers

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live in camp will readily agree, that I do not deviate greatly from the truth, for unless they are fighting, they generally spend the whole day in sleeping ; but the cavalry being obliged to take care of their horses, have no time to be idle. Besides this, every day's experience tells us, that people who lead a sedentary life are very low-spirited, particularly if they live on provisions which do not easily digest. Nor were the Antients unacquainted with this circumstance of exercise, contributing to good spirits : for says Pliny, *epist. 6. lib. 1.* *It is astonishing, how much the mind is affected by the exercise and motion of the body ;* from whence it seems to follow, that sailors would not be troubled so much with the Scurvy, if they would take proper exercise. Good sailors know this very well, and call those who have the Scurvy, by the name of sluggards, because they have observed, that the slothful are most affected by it.

6. But as there are many things which contribute to hinder or weaken the digestion

tion of the food, I shall take occasion to mention two abuses, which are very common on board of ship, and serve in some measure to promote this disorder. And here I think it unnecessary to treat of the action of digestion, for every one knows, that sailors food requires the digesting parts of the body to be sound, and the concocting powers to be in their full vigour. From whence it follows, that every thing must be prejudicial, which, by being mixed with the food, serves to render it harder and tougher. Secondly, if these things which should naturally be mixed with the food are left out, and their dissolution is on that account rendered more imperfect or retarded. And here I would be understood to mean the abuse of hot spirituous liquors and tobacco. Now though these spirits have been much praised for the purposes of digestion, and are still recommended by some people, yet they hardly ever produce the desired effect, but rather, when mixed with the food, harden it, and make it less fit for digestion.

on. Dr. Monchi has very lately recommended them in the *Harlem Transactions*, for their antiseptic qualities, and has collected a number of cases to demonstrate their absolute utility. It will be easy however from daily experience, and what has been said by some authors on that subject, to prove the contrary. Indeed it should be remarked, that the learned Dr. only recommends the moderate use of them, and would have them mixed with water and other things, and when so prepared, they certainly cannot be very prejudicial, but rather of service. But in this instance I think it needless to use them as antiseptics, for there is no putrefaction at least in the primæ viæ, where such liquors might shew their power. For it is well known, that in the beginning, nay even in the last stage of the Scurvy, the men are very hungry, and eat all kinds of provision without any apparent signs of a bad digestion. Every one who has had scorbutic patients under his care, must have remarked this circumstance, and there-

therefore it wants no proof to support it. Besides, men may be affected with the Scurvy although their provisions be very good. But why, it may be asked, are they so hungry? Is it from a fermentation of putrid matter? Or does it arise from the particles of the food being putrefied in the primæ viæ, that we should use antiseptics? This is scarcely credible, for if that is the cause of hunger, then wise nature, which always acts consistently, may be laid to act inconsistently in the stomach of scorbutic patients; for they are not only greedy after acids and antiseptics, but also after fresh meat, and if they cannot get any, they will even eat bacon, and whatever they do eat, tastes to them as it really is. Nor are they less liable to the Scurvy who drink those liquors oftener, than those who but seldom touch them, or totally abstain from them; nor can a Scurvy even at the beginning of it be cured by spirits alone, if the causes which produced the disorder continue; no not even by the famous spirit of Scurvy-grass, for I have tried

tried some experiments with it, but shall only mention the following. On our return from the West-Indies in the year 1760, in the *Princess Carolina*, the Scurvy began to shew itself amongst the sailors. When we came near the island of Floris, the mercury in Fahrenheit's thermometer was then never higher than 64 degrees, or lower than 61. On the 27th of January, *Thomas Pinctor*, a man about 50 years old, of a phlegmatic habit of body, but pretty stout; *Joost Altbe* about 34, and *Adrian Prevot* about 24, complained of pains in their joints, and a weariness in their limbs. Every morning about 7 I gave them an ounce of spirit of Scurvy-grass, with one ounce of aqua raphani, according to the Hague dispensary, at a draught; before noon, six drachms of *Silvius*'s carminative spirit, with an ounce of cinnamon water. In the evening I gave them an ounce of *Matbiolus* aqua vitæ, mixed with an ounce of cinnamon water. I went on so for many days, but when their gums began to swell, and they had more evident

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symptoms of the Scurvy, I made a mixture of four ounces of spirit of Scurvy-grass, and an equal quantity of aqua raphani (as long as I had any left) and afterwards used common water with two ounces of sugar. They drank a tea-cupfull of this every two hours. I continued it for some time, but on finding that the disorder gained ground every day, I discontinued this remedy. I afterwards treated them in the common method, but without success, for in the middle of *February 1761*, *Thomas Pinctor* died at *Heervoetsluys*, *Joost Altbe* some days after in *Rotterdam Hospital*, as did also *Adrian Prevot* in the same city, *in de lange leen Straat*, having been seized with a scorbutic dysentery, a few days before his death. None of the others, however, who had been troubled with the Scurvy died either on board of ship, or on shore. It should be observed, that in Jan. and Feb. the weather was generally cloudy and rainy. It appears from hence, that this famous antiseptic remedy did not act either in the first

first or second passages. That drinking spirituous liquors increases the circulation of the blood, and promotes perspiration, is allowed by every body, but it is as well known, that when the effect is spent, they leave the actions of the body more languid than they were before, and that this languor lasts longer than the circulatory motion which they occasioned. From whence it appears, that they only produce a temporary effect; but the preceding chapter shews, that this can be gained at a cheaper rate, and that remedy is always at hand. The immoderate use of tobacco, whether in chewing or smoaking is likewise very prejudicial, as it takes away the saliva which would help to digest the food, spoils the teeth by its acrimony, and by irritating the tongue excites too great a flow of the saliva; by which means these people can hardly ever speak without some of the saliva coming out of their mouths, and they become very offensive by their spitting, for however little they may be affected with the Scurvy, the defluxion of saliva

saliva is immoderate, even before the disorder is come to its height, so that as soon as they are troubled with the Scurvy, they are infinitely more disordered in the mouth than other people. I have likewise always observed, that those who used tobacco much were more liable to the Scurvy, than those who never meddled with it; so that those who look upon tobacco as a preventive, are greatly mistaken.

7. But amongst the causes which can dispose the body for this disorder, the want of fresh vegetables may justly be esteemed a principal one. Although this cause, as well as all the rest except the first, may be considered as an occasional one, yet I do not think it improper, to consider it as a predisposing cause, since it promotes the disorder by degrees, and people can live a long time with those causes going on, before they are affected with the Scurvy: if they are wanting, the disorder is so likewise, and if they are added to the occasional causes, they are soon productive of the Scurvy. But this last is

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the most powerful of all, and commonly the only one; for Dr. *Backstrom*, after observing that this disorder not only arose from the severe cold in the Northern climates, but often shewed itself under the torrid zone, concludes, that the true and primary cause of this disorder was no other, than too long an abstinence from all kinds of fresh vegetables; which opinion he has corroborated by many and weighty arguments, amongst which the following is a very remarkable one. At the siege of *Thorn*, besides the inhabitants of the town, five or six thousand soldiers belonging to the garrison were carried off by this disorder only; whilst the Swedes, who besieged them, felt nothing of it. The case was this; the besiegers had plenty of herbs and vegetables, the besieged none at all: but after the siege, on having got some, the disorder ceased among them. Other arguments to support this opinion may be seen in his observations on the Scurvy. How well his opinion is founded will appear

pear from hence, that as long as there is plenty of vegetables, the men never have the Scurvy, whether they live in moist, warm, or cold climates ; or lead a sedentary or an active life. On the contrary, when there is a want of them, all writers on the subject say, that the Scurvy is the immediate consequence ; that there is no remedy for this disorder except the juices of fresh vegetables, and that, by the help of these juices, it may be entirely eradicated, if it is not arrived to its last stage. *Cramer's* opinion corroborates this, viz. that the winter was a very long one, and that the vegetables by the late siege were all consumed, by which means the common soldiers could seldom or never procure any ; but in the spring, when vegetation began again, the disorder ceased. The same thing has been so often observed on board of ship, that it requires no farther proof. For when the ships have been at sea some months, and the men begin to have the Scurvy, if the disorder is not in its worst stage of corruption, the

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patients soon recover by eating fresh vegetables. It is observable also, that vegetables of every kind are good, and that whether raw or dressed, whether they be roots, herbs, or fruits, they are all extremely serviceable. I had an opportunity after the late war of seeing an instance of this, in confirmation of the general opinion. They sold at *Landaw*, out of the king's store-house, salted provisions, bacon and cheese. The common people, and the soldiers in particular, had an opportunity of buying these articles very cheap; in consequence of which, some of the soldiers by eating of them to excess broke out in scabs; others, by the cheese being much too old, had a slight inflammation in the palate, gums, and tongue, with a great flow of saliva; and others had intermitting fevers. The soldiers were carried to the hospital, where those who had broken out in scabs, on being anointed, soon recovered; the others, by abstaining from cheese five or six days, were as soon well as those who gangled their throats; and those

those who had the fever were soon recovered by Peruvian bark. Amongst at least 800 men, who were at that time in the hospital, I did not see one true symptom of the Scurvy, though *Mons. du Bois*, physician of that hospital, judged the symptoms to be scorbutic; for he called the scabs scorbutic; the thrush scorbutic, and the fevers, scorbutic: but it is sufficiently clear from the history of their disorders, that not one of the men had the Scurvy. In the mean time I can truly say, that I never saw on board of ship, food that was more likely to promote the Scurvy than this; for the flesh-meat was half putrefied, and the cheese very acrid, and had it not been for the vegetables which they eat, they could not possibly have escaped having the Scurvy. The common people too, as well as the soldiers, had the same symptoms, but their spitting was soon cured without any other remedy, than that of abstaining from the cheese. Besides, no one is now ignorant, that sailors, even under the torrid zone, are troubled with the Scurvy, though not so frequently,

quently, and yet, there are many examples of its having proved extremely fatal. But whoever considers the situation of the negroes, who are slaves to the Europeans in the West-Indies, and compares their food with that of the sailors ; the huts in which they dwell, their want of cloaths and covering, and the miserable life which they lead, will wonder that these unhappy creatures can escape the Scurvy. For all the provisions which the sailors cannot eat, from their being putrefied, serve these poor wretches for food, whilst they are equally exposed to the cold as the sailors, walking about naked in the damps, and yet have not the Scurvy ; when on the other hand, the sailors are very grievously afflicted with this disorder, particularly in winter-time, or a rainy season. The difference perhaps is to be ascribed solely to their eating fruits ; for in those countries the earth, that beneficent mother of all mankind, bestows various fruits upon them, almost without culture. Notwithstanding this, Mr. Dorf-  
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*fel*, a very skilful surgeon, told me, that in the course of nineteen years he lived at the island of Curacao, he once saw the negroes affected with the Scurvy, but the symptoms which he mentioned belonged rather to the leprosy than the Scurvy. He apprehended this disorder to have arisen from a scarcity of *mais*, or Indian corn, and therefore persuaded me to carry a bagfull of it along with me; that if, in my voyage homewards, that disorder should shew itself amongst the men, I might give them a paste made in the American manner. This paste is made much like the English puddings, and is called *funcbi*; but as I had no great opinion of it, I made no use of it, and consequently could not judge of its effect in that disorder. It appears clear from these things, of how great consequence fresh vegetables are towards the preservation of health, particularly with regard to the Scurvy. But whether or no man is so formed, that he cannot absolutely live free from the Scurvy without eating vegetables, others of

superior judgment to myself must decide. If the question is, whether seamen can live for months, or even for a whole winter without the Scurvy, I make no scruple to affirm that they can, provided they live as they generally do on board our men of war; for as I mentioned above, the petty officers, the good seamen, the rowers, and the boys, very often do live for a whole year on board our ships, without one symptom of the Scurvy breaking out. But it must be observed, that after the voyage they are very different, to what they were before they set out; though they have not perhaps totally abstained from fresh vegetables, and the fruits in season; for sometimes when the ship has been in harbour, they have been able to procure them. Nevertheless, except other causes conspire to promote this disorder, it should seem as if men might live without fresh vegetables free from the Scurvy for a very long time, at least much longer than the siege of *Thorn* lasted, from which *Bachstrom* formed his opinion. Dr. *Lind* produces many

many arguments against that opinion, but they leave the matter in doubt. The reason why the antients have not described this disorder better who in other cases have given histories of disorders with so much precision, and related their appearances to posterity with so much exactness, may be perhaps, that this disorder was not so frequent in those countries where they lived, as is still observable in warm climates, such as Spain, France, and Italy. For the winter in these climates is milder, and the inhabitants, during the whole year, have plenty of vegetables and the fruits in season. Another reason may be, that the antients lived differently to what the moderns do, and on that account were less troubled with it; and though they might observe the disorder, as it is clear from their writings they did, yet by the variableness and short duration of the causes, they never saw its ultimate effect. Perhaps likewise they confounded it with other disorders, and why should they not, as well as the moderns, who certainly have done

done so. It appears besides pretty clearly, that the last stage of the Scurvy has scarcely as yet been observed on shore, and this is confirmed by the testimonies of different authors who have written on that subject. It is not moreover very well known to us, how the antients lived during sieges, and whether they might not have so inured themselves, though deprived of fresh vegetables for a long time, as to escape this disorder. Add to this, that their observers might not be very accurate, nor are they yet sufficiently exact, for physicians even now scarcely know this disorder properly, unless they are frequently engaged with soldiers and sailors, or live where this disorder is epidemical. Dr. *Lind* mentions, amongst other things, that men have lived on board of ship for three months, nay for years free from the Scurvy, and as they had no money, could not buy any fresh vegetables, and consequently went without them entirely, excepting a few onions, or some such things, and that, through their whole voyage they  
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never eat fresh vegetables more than once or twice in a month, as appears from the second part of the first chapter of his Treatise on the Scurvy; when at the same time it is very clear, that onions are an excellent remedy to prevent as well as to cure this disorder. I myself have seen the men in the Dutch ships very frequently without any money, but yet they have been able to get at the fruits in season, and fresh bread. How then it may be asked were they able to procure it? That question is easily answered, if we recollect, that the Italian and Spanish boatmen are very often dressed in English or Dutch cloaths. Nor is the instance mentioned in Anson's voyages of more weight, for it is very certain, that if any one has had this disorder for a certain time, although he may be cured, yet he remains very liable to relapse; the conspiring causes act likewise more forcibly at one time than at another. It is scarce credible, that there should be countries where the inhabitants should not have fresh vegetables for a whole winter,

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for they always gather some at the proper seasons, and preserve them against winter. In vain also do they tell us, that there are some men who naturally dislike vegetables, for perhaps they eat fresh meat, milk, and other things which may be mixed with vegetables, and the fruits in season. Nor can it be urged as an example, if amongst thousands of men, one perhaps should be found who was able totally to abstain from them.

8. Having explained the causes which dispose the body to contract this disorder, it remains now to consider what causes, when applied to the body, are immediately followed by this disorder ; or what, if they find the body so predisposed, immediately produces such a habit of body, as is called the Scurvy. Now these are such as hinder, diminish, or suppress insensible perspiration, as cold increasing by degrees, particularly if it is at the same time moist ; and the passions of the mind. Some others of less moment may be added to these, by which that wholesome eva-

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cuation may be hindered ; but I intend to mention only the principal ones. It is very certain that in warm climates, or in summer, sailors in general live free from this disorder, that is, as long as the heat prevails ; and that in the same climates the Scurvy is seldom, nay in most of them never observed ; on the other hand, that in cold and moist climates in autumn and winter, this disorder is very prevalent. From hence it may be inferred, that this difference can be ascribed to no other cause, than to the free or to the impeded excretion of the skin ; for it is always observed, that men are free from the Scurvy as long as this evacuation duly and freely takes place, and that, as soon as it is suppressed by any cause whatever, so soon symptoms of the Scurvy will appear. The ships which every year go to the islands of *St. Eustacia* and *Curacao*, are an instance of this ; for if any of the sailors are already affected with the Scurvy, as was the case in the *Princess Carolina*, that is, when the ship left *Holland*, and before they got to the tropic,

tropic, the disorder ceased by degrees : on the contrary, if the sailors are bound homewards from the Indies, and have a cold passage, it has the contrary effect. The *Damniatan* and the *Stadt Dordrecht*, which returned from India in the year 1759, afforded melancholy instances of this. The one at *Spithead*, and the other at *Plymouth*, buried numbers with the Scurvy. I was much more fortunate in the *Prince's Carolina*, for though many of the men had the Scurvy, yet it did not arrive to that degree of malignity, as it did with them. I could mention many more such cases, but it is not consistent with my design.

9. Natural philosophy teaches us, that bodies are condensed by cold, or that there is such a power in cold, that bodies of whatsoever nature when placed in it, are more dense, or are reduced into less compass than before, frozen water only excepted. But this difference does not come into consideration with respect to our bodies. For we know by experience, that

that the cold applied to our body produces the same effect; namely, that it contracts the parts of it; from whence it arises, that our cloaths in winter fit looser upon us, and in summer tighter. For the compass of the body increases and decreases at times. But besides this general effect, it produces others in the human body; for it not only tightens the common integuments of the body, as if they adhered more firmly than before to the habit, or the weight of the atmosphere had been increased, but it likewise shuts the pores and vessels of the skin, and straitens them, so that they are impenetrable to the substances which they received before. By diminishing some, it likewise increases others; that is, it diminishes the external heat, but the internal is increased on account of the greater attrition; and as it commonly suppresses the perspiration, the urine and fœces are more plentifully discharged; it renders the fibres firmer, the body more vigorous and alert, and prompts it to motion, by which

which the business of perspiration is promoted ; if it is too severe, the fibres grow stiff, the fluids are condensed, and some part, or even the whole of the body, grows torpid and death follows. It seems to be pretty clear from this, that the cold does not so much contribute to this disorder ; but we know that there are different degrees of cold, and according to these the body is affected in different ways ; from hence it happens, that this disorder is observed more frequently at one time than another. There seem to be three degrees which promote this disorder. 1st, When it begins to be cold, and the mercury in Fahrenheit's thermometer falls 20 degrees, or thereabouts, lower than it was in summer, in whatever country it may happen. 2dly, When the mercury is between that degree of cold and freezing, and the air is moist. 3dly, When the mercury falls very much below the degree of freezing, and even below nought, as is the case in some northern countries. In these three degrees the Scurvy is generally very rife.

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But cold at the beginning, though it is not very powerful, yet it affects our bodies very sensibly, and exerts its influence upon the external skin, and finding it lax and inclinable to perspiration, it contracts and relaxes it by turns. By which means the efforts of nature are perverted, and the perspiration is sensibly diminished; for of those particles which are at that time carried to the skin, the more subtle only can be evaporated, and the grosser remain; hence, what is called the goose's skin becomes very common in autumn, which is the first symptom of the Scurvy, as will be mentioned hereafter. For as the body wants the power and strength, either to promote other evacuations, or to keep them in their natural state, there arises an increase of the humours, and a retention of the more acrid parts, which ought to be thrown off from the body. This produces rheumatisms and pains in the joints, if they fall on the internal parts, convulsive coughs, asthmas, different spasms, fe-

vers, dyarrhæas, disenteries, stranguries, and other disorders. But if the body is so disposed, it produces that depravation of the fluids, which is called the Scurvy. The second state of the air which is most apt to cause the Scurvy, is a moist and cold air; for it is very clear from *Sanctorius's* observations, that such a state of the air obstructs the business of perspiration; for besides, the perspiration being checked by the too great moisture of the air, the solid parts of the body are relaxed, by which many of the functions, which depend on their due strength, are weakened. Add to this, in very cold weather, from the too great rigidity of the solid parts which resist the fluids too strongly, and from the too great condensation of the fluids which are rendered less passable, the circulation of the blood is retarded; by which means those functions are impaired, which depend on the free circulation of the blood. It appears from hence that cold, though dry, may produce the Scurvy in a body predisposed for it; and indeed, instances of

of this are found in voyages and physical observations, for those unhappy men, who wintered in the most northern parts, died of the Scurvy. *Vide Modern history by Salmon, vol. 7. chap. 6. pag. 869.* The sailors likewise in *Henry Ellis's voyage to Hudson's Bay*, were grievously afflicted with the Scurvy; for the cold was so severe, that every thing was frozen, even bottled beer that stood very near the fire in the midst of this frost; and then the Scurvy was at its highest pitch. See besides, the letter which Dr. *Lind* has inserted at the end of the second part of his Treatise sent to him by Mr. *Cook*, a surgeon, who had an opportunity of making some observations on the Scurvy, in Russia and Tartary. It is there mentioned, that the winter begins in those parts generally in the month of October, that the lakes and rivers are frozen over in the month of November, and remain so till the beginning of April; that the Scurvy began to shew itself in the month of February, and was very violent in the month of March;

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that the greatest part of the men who were affected with the Scurvy, were cured about the end of April. Mention is made, likewise, of some fine intermediate days. From hence it may very easily be gathered, that too great moisture, as the learned *Lind* supposes, was not the occasion of it, for it is well known, that the weather is much more settled in those countries than in France, Italy, or in some of the German provinces, where the Scurvy is unknown. Mists, indeed, sometimes rise from the sea, which they call *froftschmack*, but on shore they do not rise in such abundance from the ice, and yet the Scurvy is very frequent in these countries. But it is very certain, that no state of the air is so apt to produce the Scurvy as a damp and cold one, for besides the abovementioned effects, they seldom give the men any opportunity of duly exercising their bodies, especially on board of ship; and from hence it appears, that in such a situation many causes concur to produce the Scurvy. For if we recollect, that a damp air

air produces the Scurvy, because it relaxes the parts too much, and makes them tend to putrefaction, according to *Monchi's* opinion, in the *Harlem Transactions*, then most certainly the Scurvy must rage epidemically under the torrid zone; for there in the season, which they call winter, it rains almost continually, by which means the air is not only damp at the same time, that it is in some measure warm, which most certainly must relax the parts, more than our damp and cold air; and yet these miserable Æthiopians, naked and ill-fed as they are, live entirely free from the Scurvy. It is moreover observed in people who have the Scurvy, particularly in the beginning of the disorder, that their skin is dry, rough and scaly, which is directly opposite to moisture as well as putrefaction. Nor is the Scurvy so like the plague, which, as the learned Dr. *Lind* says, from the observations of writers upon the subject, takes its rise from a moist and warm air occasioning putrefaction, which, by adding to it the sailors general

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food, and the cold they are subject to, becomes capable of producing the Scurvy; but if that was the case, the very food, which is sure to produce the Scurvy, would be a specific against the plague, which is scarcely credible. It is very certain, therefore, that a cold air, though dry with sailors diet, and their daily abstinence from fresh vegetables, may very naturally produce the Scurvy, and that the more concurring causes there are, the more malignant and rapid the effects will be; from whence we may conclude, that if the abovementioned causes concur, the Scurvy may be contracted in every part of the globe, whether dry or damp.

10. The passions of the mind contribute not a little to the producing of this disorder, and the increase of it, and even occasion death. They likewise often promote a recovery, and are themselves very frequently occasioned by the disorder itself. But amongst those passions which contribute to the Scurvy, we principally reckon fear, grief, and terror in a certain degree,

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It is well known, that these passions produce an effect in the body diametrically opposite to joy, which promotes the circulation of the fluids, increases the heat of the body, gives a redness to the skin, accelerates the business of perspiration, and makes the body more brisk and alert. Hence it cannot but contribute to health, except in some few instances of sudden and immoderate joy, as in the case of the Roman woman, but these are very seldom known to happen, nor is there any danger of them on board of ship. But by the other passions the vessels are contracted, particularly those of the skin, the blood is driven to the interior parts, the face is pale, the skin shivers, and the extremities are cold; but if those passions are very violent, the limbs tremble, the heart palpitates, and other bad symptoms follow: for besides their disturbing the motion of the blood, they give a check to insensible perspiration, weaken the powers of digestion and chilification, and change the crasis and temperament of the fluids. If

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they continue to operate any length of time, the fluids thicken, and obstructions in the viscera take place, from whence other chronical disorders arise; which shews, that these gloomy passions contribute very much to produce the Scurvy. This is confirmed by melancholy instances of those who have been compelled thro' necessity or force to go to sea, for they are scarcely there a few months before they shew the state of the viscera, by the swelling of their bellies, and if the other causes concur, they are soon seized with the Scurvy. I have observed this more than once in men, who expecting to be punished severely for some offence which they had committed, in a short time after were seized with the Scurvy. If these passions continue to affect the mind, they increase the disorder very rapidly. The writer of Anson's voyages has remarked, that the disorder was more violent, and the symptoms increased more rapidly, when the men lost all hopes of seeing their native country. But that these

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passions contribute to hasten death, is proved by a remarkable instance which I saw on board the *Gorcum*, Capt. *Evertzen*, at *Helvoetsluys*. At the time when the officers mustered the men belonging to this ship, one of the marines desired leave to be dismissed the service, alledging, that the Scurvy rendered him incapable of serving any longer. But when I told him, that he would be well enough long before he went on board, and that he had sufficient strength of constitution to live a long time in his present state, and that the officers would not suffer him to be discharged, he frowned and answered me, "I shall enter, but I shall soon die :" and, as he said, so he did ; for he died the same day. It is clear from hence, how great an influence an unwelcome piece of news may have upon this disorder. But the effects which good news produces towards a recovery appear from the account which Mr. *Yves*, an English surgeon gives, quoted by Dr. *Lind*, in his Treatise on the Scurvy. It is there said, that the *Dragon* sailed

failed out out of the *Bay of Gibraltar* the 8th day of *January* 1744. The Scurvy had already appeared amongst the men ; it was a rainy season, and it lasted to the 27th of the same month. On the 10th of *January*, fifty of the men had the Scurvy. On the 20th the number increased to 80. Many of these had stiff, contracted, and ulcerated legs : their gums were putrid, and many had a difficulty of breathing. Besides this, there were six who had a catarrh, 50 out of the 80 were at the worst stage of the Scurvy ; when they came to the island of *Hieres*, about the end of the same month, and heard that they should shortly engage the enemy ; this welcome piece of news had such an effect on them, that by the 11th of *February* almost all of them were free from the disorder, excepting four or five who could not engage the enemy : the writer adds, that from the 3d to the 10th of *February*, thay had five messes of broth made of fresh meat and herbs, but that this could be but of little service in their

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recovery. This is certainly a most extraordinary case, and shews how much joy may contribute to the cure of this disorder. On which account it was really a great pity, that it did not last longer, for after the eleventh they fell into their old disorder, without doubt from the ill success of their engagement. But terror, though it affects the body very forcibly, yet does not contribute so much to this disorder as fear and grief, which are often of a very long duration. Nor is it common to see sailors struck with terror, for they seldom are afraid, unless the danger is immediately before their eyes, and if they do but escape the rocks, they never value danger or talk about it. Nor do I ever remember to have seen this disorder break out in healthy men, in consequence of any terror; but it is otherwise where they have the Scurvy, for then they are always low-spirited and fearful, and terrified by the slightest circumstance, as the writer of Anson's voyages has very well observed, that the men who had the Scurvy grew faint-

faint-hearted. *Vid. Anson's voyages pag.*

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11. Some causes still remain to be considered, which are capable of producing the Scurvy, and are quoted by Dr. *Lind* in his Treatise on the Scurvy, and by *Van Swieten*, in his Commentaries on *Boerbaave's Aphorisms*. But as these never occur on board of our Dutch ships, I think it unnecessary to give an account of them. As to the others which may be said to refer to the Scurvy, I have already enumerated them. Having considered the causes of the Scurvy, I do not think it foreign to my subject to mention who are the people on board men of war, that are most liable to this disorder, that they may get assistance in proper time. Amongst these may be reckoned old men, of whatever habit of body, melancholic, and hyponchondriac people; almost all, who, through force or necessity are obliged to go to sea, as poor men who cannot live on shore, who have met with misfortunes, or who are condemned by the laws of the land, particularly

ticularly if they are past thirty years old. All those who by their station are exempted from hard work, such as the coopers, carpenters, stewards servants, or clerks, the chaplains, &c. &c. Those who are of an inactive turn, and are destitute of proper cloaths, let them be of whatever country or whatever constitution; those likewise who are weakly, and the convalescents, particularly from intermitting fevers, drunkards, and great smoakers and chewers of tobacco.

12. But as the Scurvy begins, so likewise does it increase by degrees, namely, if the causes continue, and no proper assistance is called in, sometimes indeed quicker, and sometimes slower, according to the greater or less number or power of the causes which have produced the disorder, keeping in the mean time no regular course till the patient dies. Nevertheless in the three periods which are easily distinguishable, it may be considered first in the beginning, namely, when the health begins to be impaired, and when it is indicated

cated by symptoms peculiar to this state, that the patient labours under such a depravation of the fluids; in its middle state, when the symptoms are more conspicuous so much, so as to shew, that the functions are impaired, and the fluids depraved; and in the end, or its last stage, which is nearest to death. The symptoms may be marked from these three periods; but as some of them occur during the whole time, and last, from the beginning of the disorder till death, and as their difference depends only on the longer or shorter duration of the disorder, I think it more adviseable to explain the symptoms in the order they appear through the whole course of the disorder, and the variations or changes which happen in them. Those which properly belong to the second and third stage I shall explain in the two following chapters.

1. All writers on the subject agree, that the first symptom of the Scurvy is an uncommon slothfulness, and aversion to all kind of labour; attended with a great desire

ire of sitting or lying down, especially in any obscure corner. This increases by degrees, is so soon converted into a spontaneous lassitude, and heaviness of the limbs, that the men are fatigued, and out of breath, with the least motion. If the disorder gains ground, and they strive to keep themselves in motion, besides the lassitude, they feel heavy pains all over, as if they had been greatly fatigued. At length, having lost all desire of moving they soon lose the power of motion, by the pains which they feel, and then find such a difficulty in breathing, that they seem to be suffocated with the least motion. Nor are instances wanting of men who have actually been suffocated in this manner, on board of ship, for want of having been kept to work while they were able.

2. Another symptom among the first is, when after having been dull and heavy, they become fearful and timorous, they soon then are taken ill of the Scurvy, in which state they are struck with terror from

from the smallest incident ; nor can they be convinced, that they are secure, at least I could never inspire them with any degree of confidence, for they distrust every body, and think every one their enemy. In the beginning of the disorder, or the middle stage of it, they move their eyes very quickly, and seem to open them more than usual, as if they wanted to examine the objects more clearly, or to avoid some imminent danger ; whilst their whole body seems languid, and in a manner stupefied. They are very much afraid of being seen by the officers at those times, and hide themselves in any dark corner, lest they should be obliged to work. If the disorder increases, they lose all hopes of recovery, and cry on the most trifling occasion, though they were brave fellows before this disorder ; after this they become almost insensible, and as if their spirits were quite broken, by a long continuance of their sufferings, bear their misfortunes and injuries patiently without murmuring, and cry like children.

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3. The colour of the face is changed, but does not appear to have that paleness which people have after fevers, and severe illnesses : nor is it such a colour as people of weakly constitutions have, but there is something in scorbutic patients of a robust appearance, though without any redness ; nor is the face emaciated or extenuated, but seems to have a mixture of a yellow and blue colour, joined with its natural paleness. The same colour is observable in the whites of the eyes, and the red vessels in them disappear. The carunculæ lachrymales turn pale, as well as the lips, which grow of a sublivid colour. Those who in health had any colour, still retain it, but it is mixed with a yellow and blueish colour. The vessels, which before were full of red blood, seem livid, as is often the case with some people in very cold weather. The more this disorder gains ground, the more this yellowness of the face is observable ; and if it proceeds to its last stage, the colour of the face,

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from being yellow and blueish, becomes inclinable to a green.

4. Scorbutic people have their belly somewhat swelled at the beginning of this disorder, and find a tightness there, without any pain. At least, no one ever complained to me of any, excepting a troublesome sensation in the epigastric region, which they said, felt as if bound with a fillet; they are likewise costive.—As the disorder increases, the face swells, particularly the lower eyelids, which is principally observable in the morning, when they rise. They often continue in this situation a pretty long while, but as the disorder proceeds from the middle to the last stage, the abdomen swells very much, as well as the face and the eyelids, the legs grow œdematos, and the patients dropsical.

5. Scorbutic people in the first stage are very liable to different kinds of pains, like those in the rheumatism, shifting from one part to the other, and thereby constituting different disorders, as the bastard

bastard pleurisy, the sciatica, &c. &c. and then they are pretty severe, and particularly about the loins, where they are constant. As the disorder increases, and tends to its middle stage, the pains do not shift about any longer, but settle in the joints, especially of the knees, and these are frequently very excruciating ; and then the flexor muscles of the legs are shortened, and the knees swell a little. But if the disorder has passed its middle stage, the knees swell very much, and the legs are as hard as wood, but, which is very remarkable, retain their usual form. If there is any swelling in the legs, besides that of the knees, it is very slight, but both the legs and the knees are in great pain. If the patient sits or lies down much, the flexor muscles of the legs are so contracted, that, in a short time, they cannot be stretched out again, so that at last, by little and little, the heels are drawn up to the buttocks, which happens chiefly to men of a dry habit of body, and to aged people. At length, if the patient

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lives long enough, the hardness of the legs lessens, and they become œdematos, while the pain and contraction of the legs continues, and the patient remains unable to walk. But if he recovers the use of his legs in any degree, he will be able to walk till he dies.

6. The pulse in the beginning of this disorder remains in its natural state ; or if there is any difference, it is slower than usual ; in the middle stage it is nearly the same : in the last stage it is languid and slow, then unequal and intermitting, if the patient lies still ; but if he stirs about, it is unequal and quick. If death comes on slowly, and no manifest cause hastens it, the body retains life for one or two days, though the extremities are cold, and without any pulse. I have observed, if there is any life remaining in the lower arm, that they are able to bend their fingers. And though the arm is lifeless, that they still can bend and extend it, but cannot move their fingers, they enjoy, however, their senses to the last hour of their lives.

Lives. There is no fever, as appears from the pulse, in the three stages of the Scurvy; in the second, indeed, when in a manner it has passed the middle stage, as well as in the third, there can be none. In the beginning of the illness a fever sometimes cures the disorder. In a beginning, and a confirmed Scurvy, the patient enjoys a good appetite, which remains sometimes to the end of his life. From what has been said it appears, that these symptoms of the Scurvy have something in common with other disorders, particularly in the beginning. But he who can account for the abovementioned causes, will easily discover the diagnosis, and if he does not, the following symptoms will remove all doubt.

7. The first pathognomonic symptom of this disorder is the goose skin, which has the following appearance. In the beginning of the Scurvy, small tubercles appear on the skin, like those which shew themselves, when any naked part of the body is exposed to the cold. But it must be ob-

served, that the epidermis in this state protuberates more than usual, that it does the same in the parts which are covered and warm, and that, though the tubercles are greater and rise higher, they are yet not so numerous as when arising from the cold, and that some of these are very large, and from a large basis end in a point. At the top of these tubercles, there is a yellow and somewhat red point like a bladder, but in a few days the tops of these tubercles grow red, and then the point appears better. The colour increases daily and gets darker; the tubercle by degrees is depressed and grows flatter, till at last it is quite smooth, and then there only remains a small purple spot, and this generally happens in the latter end of the first, or the beginning of the second stage. But the longer they remain, the darker they grow, till at last they are quite livid, which generally takes place about the middle stage of the Scurvy. These spots are somewhat roundish, about the bigness of a lentil, and are generally observable about

about the knees, and the inward parts of the legs, and thighs, but are seldom seen in the other parts of the body. If the spots remain any time, the scarf skin which covers them falls off naturally in scales, or the cuticle is abraded by scratching it, and then they disappear, but others succeed them very soon, and generally continue to the end of the second stage when they finally disappear, nor do they terminate in suppuration, and are but seldom observed in the third stage. This goose skin appears sometimes ten or twenty days before the gums are affected, so that if the tubercles rise, and the tops of them are red, it may be always foretold, that the gums will soon be affected. In the beginning of this disorder the skin is dry and rough, in the middle dry, rough and scaly; but at the end, when the dropsy comes on, the hair drops off.

8. The subsequent pathognomonic symptom is the ulceration in the gums. About the end of the first stage the gums begin to itch, to swell, and grow red, and

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if they remain in this state for some days, they contract small ulcers, particularly in the edges, are very painful, and separate from the teeth. The more the disorder gains ground, the more they swell; and the gums separate from the teeth, by which they begin to loosen, and are soon so loose, that they can be easily pulled out, or fall out of themselves. When they are in this state, the gums swell very much, and bleed upon the least touch. Besides this, on the internal part which is next to the teeth, fungous flesh sprouts up, which sometimes rises above the edge of the teeth. But the parts of the gums which are between the teeth swell, and on account of the pressure of the teeth, grow gangrened and putrify. The same happens likewise, if they grow too much above the teeth. Then also the gums easily bleed, and ouze out a black clotted blood, which sticks between the teeth and the gums, but may be soon removed with the fingers. But if it putrifies in the mouth, it not only gives a most fœtid smell,

smell, but likewise make the ulcers larger, which by degrees destroy the gums, and produces a gangrene, and *caries* in the adjacent parts; but this seldom happens unless in the last stage of this disorder. From what has been said it appears, that the three periods of the Scurvy may easily be distinguished, since there is scarcely an instance of a man's having that disorder, without having these symptoms likewise, and therefore they may be considered as the true and certain signs of it.

13. In the second stage of this disorder many more symptoms occur, besides these which have been already mentioned; but they are not so constantly met with as the former, nor do they happen in all cases. Amongst these, the too great defluxion of the saliva is a principal one. But this varies very much, for there are instances of people, who, though their mouths are very much affected, yet secrete very little saliva; others, on the contrary, though but little affected, have a great flow of it I have observed this, particularly in phlegmatic

matic people, who naturally spit a good deal, and especially in great smoakers and chewers of tobacco, which, if it is an attendant symptom, generally continues to the end of the disorder. I have remarked also, that the teeth in these patients loosen sooner, and that their gums are sooner destroyed, than in those who do not use tobacco. Very acute pains are generally felt in this stage of the disorder, in some one or other part of the body, particularly about the bones; and these never yield to any remedy, nor do they shift about at all; when the little spots disappear, (vide the foregoing No. 7.) larger succeed, rather deeper than the first, more under the skin, and of a different size; at first they are red, then grow livid, but generally keep red as long as the legs remain hard; but when they become œdematosus they grow livid and black, and are like the spots which arise after contusions. These are so thick upon the legs and knees, that nothing of the usual colour of the legs remains, for they are red almost every

ry where, and black and blue in some particular places. In this stage, the legs are very troublesome, are apt to itch, and to be painful, and if ever so slightly scratched, the epidermis is rubbed off, by which means scorbutic ulcers break out, and not spontaneously, as some suppose; at least I never observed any ulcer, unless it came by scratching or accidentally. These have hard edges, and never emit any pus, but increase every day, and are generally covered with a yellow crust, as if occasioned by an escharotic. If the pellicle is separated, the ulcers bleed, and are of a livid colour at bottom. With respect to the cure of them, it is generally attended with great difficulty. Indeed, in general, they cannot be cured at all, unless the disorder is removed: but if they are kept clean and well managed, they seldom increase, and if they do, but very slowly. The lint and plaisters are tinged with a yellow colour. Scorbutic ulcers of another kind occur very frequently, but these are principally observable in men of a more relaxed

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ed habit of body, who by fevers or other disorders, or by any other accidents, have been confined to their hammocks, and contracted the Scurvy. In these ulcers, instead of a little yellow skin and hard edges, like those in the former, the edges are soft. The funguses, which are deep and livid, bleed very much, and can hardly be stopped. About the end of this stage, the knees are sometimes in great pain, swell, and feel very hard to the touch : besides this, a fluctuating matter is sometimes felt, and lodges sometimes between, and sometimes above the capsula of the joint ; and then if the whirl-bone moves, which can seldom be observed on account of the swelling, there is just such a noise as arises from broken bones, when they touch each other, and are moved : otherwise, if the patient's legs are capable of moving, a very loud noise is sometimes heard. It is observable in some patients, that their legs swell about the evening, and fall again in the morning, or after sleeping, particularly in men of a relaxed habit,

habit, and those who have contracted the Scurvy, in consequence of intermitting fevers. It is one of the worst symptoms when the œdema continues after sleep. It sometimes happens, that the patients die suddenly whilst they are walking, eating, or in their hammocks. There are other symptoms which occur besides these, and which deserve no less to be taken notice of, namely, that if any part of the body is accidentally wounded, or sprained, or distorted, or any bone fractured, whilst the person was in health, and after a certain time he contracted the Scurvy to a particular degree, the ulcers then grow raw again, and are scorbutic, though they were almost or entirely healed ; the bones which were lately set break afresh, nor do they unite again till the disorder is cured. Besides this, the joints which are sprained and distorted, although they were reduced, swell very much, and grow hard, and contract scorbutic spots, which is the case likewise in fractures. But it is attended with this surprising circumstance, that the bones

bones which are fractured, besides their being swelled and hard, are never in any pain; and that, though they should continue fractured for some months, if the disorder is properly treated, they will be united again perfectly, ~~and~~ without the least deformity. If any accidents happen whilst the patient has the Scurvy, the parts swell by degrees and grow hard, nor are the first symptoms of the Scurvy, or the most remarkable ones observable in them, but the disorder affects the whole body equally.

14. The symptoms are so severe in the third stage, that there are seldom any hopes of recovery. It happens sometimes, indeed, that one or two may escape by chance. I saw an old man on board the *Stadt Delft*, very grievously afflicted with this disorder, who upon the least motion fainted away, so that he was obliged to lie continually upon his back, nor could he move his body from one side to the other, or even sit up in his bed, and yet, by the help of broths and fresh vegetables, he recovered

recovered his strength so much in the course of twenty days, that he was not only able to walk about in the open air, but after a few weeks to perform his duty on board. A cooper on board the *Gorcum*, is another instance that I met with. This unhappy object was sent by *Captain Evezzen to Hel-voetfluys*, and fainted away very often in the small boat. But besides the usual symptoms in this disorder, there was one very remarkable one, which I observed eight or nine days before he came on shore, namely, a crackling between the ribs, the breast bone and spine in drawing his breath. When he drew his breath pretty strongly, I not only perceived a præternatural motion of the bones, when I placed my hand upon his breast bone, but likewise heard a noise. When he came on shore, besides broths, he eat red cabbage in the Dutch manner, once or twice every day, with vinegar, butter, salt, and pepper, which he seemed very fond of. Sometimes he eat baked apples, and drank a little of the sweet French wine, which is common in this coun-

country; in a few days after, when the ship came into port, I saw the poor wretch put his hammock on his back, and make for his own home. Besides the above-mentioned symptoms, palpitations of the heart, and faintings are very frequent in this last stage upon the slightest motion: but if the patients lie quite still, they appear to draw their breath very easily. Hæmorrhages from the nose and mouth, and dysenteries are likewise very common, but these are not attended with gripings, and most commonly discharge only mere blood. In the second stage, I likewise saw blood drop from the nostrils, but in a small quantity. In this stage the ulcers grow worse, and are soon gangrened, and the broken bones which have been consolidated many years are dissolved again. This circumstance was observed in the course of Anson's voyage. The dropsy and gangrene are the final symptoms; but besides these, there are a great many others which are ascribed to the Scurvy, but which are not peculiar to it, and only casually

sually accompany it, as different species of fevers and pains. On which subject, *vide* the authors who have written on the Scurvy. I have seen instances of men who were slightly infected with the Scurvy, contracting a putrid continual fever, but I never saw any one in a confirmed Scurvy, who was seized with a fever, as I observed, (§. 12. No. 6.) and the reason is obvious. Some authors have observed, that there is a slow fever in dropsies, when the water begins to putrify. *Vide Van Swieten*, in his Commentaries on Boerhaave's Aphorisms, §. 1151. But although the dropsy is a disorder which is very remote from a fever, yet there is a great difference between a man who is dropical, from an obstruction of the viscera, and one who has the Scurvy at the same time. For in the first, the difficulty in breathing arises from the water contained in the breast, or from the diaphragm, which rises too high from the quantity of water; in the second, besides the water, the lungs are affected by the obstructions, as will appear hereafter,

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by the dissections of the bodies. Yet, perhaps, scorbutic patients may have a fever for some few minutes, but they cannot then survive long.

15. But to complete the history of this disorder, it will be necessary to mention the observations I made on the blood of the sick, and the bodies of those who have died of it, which were done as accurately as the conveniences on board of ship would allow. But there is no necessity I think for acquainting the reader, that I was not very nice in these dissections, as there were no conveniences for that purpose on board of ship ; nor could I, besides, keep the bodies above an hour before they were obliged to be thrown into the sea. But I always opened the abdomen and breast, and sometimes the cranium, and thus examined the other parts. But at the three periods abovementioned ; namely, in the first, middle and last stage, I took, or ordered some blood to be taken from the patients arms. From some I took it in the beginning and at the end ; from others in the middle

middle and at the end ; from some in the beginning and the middle, and from others in all the three stages, but in small quantities, for fear of injuring the patients, and always looked at it after letting it stand for some hours. What appearance it had the following account will shew.

I. On opening a vein in the first stage of the disorder, with a large aperture, the blood sometimes started out, sometimes dropped along the arm. It was glutinous, thick and black, and after it had stood an hour in the bason, began to deposit a yellow serum. The colour on the surface was redder than when it was warm, but on inverting the placenta it was black, as was the internal appearance after opening the vein. When it had stood two hours, the placenta swam at top in its own serum, but for the most part, stuck on one or the other side of the bason, but the longer it stood, the less the coagulum was. If I kept it ten hours, or thereabouts, the serum grew red a little, which I attributed to the motion of the ship. When the super-

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ficies of the placenta was moistened by the serum, it lost its red colour, and became blacker. In some I found the buff greenish on the superficies of the placenta, in other respects it was like the rest.

2. In the confirmed Scurvy, I found the blood nearly the same as in the first stage, with this difference only, that it came with more difficulty from the veins, and in dropping was blacker than the first. When I put a white napkin under the arm to receive it, it immediately coagulated, and the spots upon the napkin did not spread at all. When I kept the blood for some hours, the lower part of the placenta deposited a black muddy grumous matter, which was fibrous, and the serum became reddish. But I never kept the blood above ten hours. In this stage the placenta was frequently covered with a thin green pellicle, the serum scarcely separated from the blood, and the coagulum sometimes remained black for a long time, without the serum being separated, and a

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less quantity of it was always secreted than in the first stage.

3. In the third stage the blood was as black as ink, and generally had a greenish pellicle upon the surface of it, which I could not easily draw away from the blood, nor did the serum easily separate. Besides this, the placenta did not cohere together so firmly as in the first and second stage, nor could I easily touch it, for it soon ran into clots. About the internal surface of the basin, there was a foul flakey black matter formed, which proceeded from the lower part of the placenta that adhered to the vessel. The blood in general separated its serum in the middle part of the placenta, and the placenta, which very often stuck in the bottom of the basin, was covered by it, and if it stood any length of time, the serum was a little red, which most certainly was occasioned by the motion of the ship. It always contracted a coagulum, and separated the serum, but the coagulum was always greater than that

of the blood in the first stage. The serum had an acrid taste.

4. *Christoph'r Kent*, of the *Stadt Delft*, starved himself to death, in consequence of some whims which he took in his head, that he would take no sustenance with his mess mates. After having for some time lived upon some musty bread and pease with the hogs and sheep, he was feized with a violent Scurvy. Afterwards he lived eight days totally without food, by which he died. I supported this man myself upwards of a month, I forced him to eat, and even thrust victuals into his mouth, so that he was obliged to swallow it. But at last he was so possessed with these strange whims in his mind, that he would not swallow any thing, either by fair or foul means; I left him at last to his fate, lest he should die under my hands, and for fear I should suffocate him. Two days before he died, I took four ounces of blood from a vein in his arm. The blood was very black; the pellicle which it contracted on the surface was green, it coagulated

lated and separated its serum, as in the foregoing number.

5. In the same ship in the middle of winter, at *Cadiz in Andalusia*, I had an opportunity of viewing the blood in a different state. There were a great many at that time in the ship who had the Scurvy. Out of these, I picked out six men nearly in the same state, and found the blood which I took from them the same as in the preceding No. 2. From the day that I bled them, they ate broth twice a day, made of fresh meat and herbs, with one or two glasses of red wine. I continued this for ten days; in the medicinal way I gave them every evening a pill made of squills, garlick, Venice soap and *tberiac. androm.* and in the morning a little wine and bitters. Again, at the same time, I picked out six others like these, and treated them in the same manner, but took no blood from them. At last the tenth, eleventh, and twelfth day of their cure, I opened a vein again. The blood was then much redder than before, and

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when I compared it with the blood of those who were blooded at first, I still observed a difference, for the blood of the former was redder than that of the latter, and they got well sooner. It should be remembered though, that the first six took as much exercise as their strength would permit. The other six did not, or at least did not take so much.

6. I made the following observation in the harbour of the island of *Curacao*, on the blood of a man, who appeared to me to have the Scurvy; for excepting him, there was no one in the ship who had it; and at the same time, besides the symptoms of the Scurvy, I observed others in him, which seemed to shew a complicated disorder, on which account I shall take the opportunity of mentioning his case here. *Michael Klein*, a marine on board the *Princess Carolina*, about 40 years of age, was very much afflicted with the Scurvy in the winter of the year 1759 and 60. He was partly recovered at sea, but when he came on shore, in the months of March and April,

April, was quite restored to health, and went on board again; when the ship came to the above port, on the twenty-third of September, 1760, he was seized with a shivering cold, which was followed by heat, which lasted about six hours, with a small and quick pulse. He afterwards recovered his natural colour, but he complained of a great pain about the præcordia, and a loss of strength. His pulse was small, slow and soft, nor did I observe, in the whole course of the disorder, any præternatural heat. His tongue was white and greenish, he had a bitter taste in his mouth, and a retching to vomit, which left him after three days. It should be observed here, that this man had been very inactive during the whole voyage, that his skin for some weeks before had been very dry and parched, that his gums at that time were ulcerated, and had the appearance of the Scurvy, but that he walked and ate well. Nor did the Scurvy increase very rapidly, till on the twenty-third he was seized with symptoms  
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of a fever, which raged at that time amongst the sailors. After a dose of ipecacuana, he took an apozem made with Peruvian bark, and salt of wormwood, sometimes a pill of the extract of Peruvian bark, powder of contrayerva, *sal. volat. cor. cer. camphire* and *therfac. androm.* For his drink, I gave him limonade at first, but he did not much like that, so he drank water alone. On the twenty-seventh of September his body was yellow all over, which was one of the worst symptoms in that fever; then his skin began to be moist, his breath stank very much, all his teeth loosened, the swelling and ulceration of the gums increased, and funguses rose above his teeth. He lay in this manner very quietly upon his back, till the third of October, when, without being in the least disturbed in his mind, he expired on that day. On the twenty-fourth of September I had taken from him about six ounces of black blood from his arm, which, after it had stood some hours, appeared green on the surface;

face; it separated little or no serum, but grew a little thick; on turning the bason up a little, it flowed and contracted no coagulum, it was like ink, very sweet to the taste at first, but left a sharpness behind. On opening the body, I found in the abdomen about three pints of yellow reddish water, the liver and the spleen were of a grey colour. The first viscus was hard and very large, the gall bladder was quite full of green bile, but the spleen, except its being a little white, appeared in its natural state. Both the viscerae when dissected, were of their natural colour, there was nothing particular to be seen in the breast. When I dissected the right ventricle and sinus of the heart, the blood appeared like ink, as it did likewise in dissecting the greater vessels; but it should be observed, that the body was in some measure warm when it was buried, for the bodies in this climate cool very slowly, on account of the external heat. The mercury

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in Fahrenheit's thermometer was at eighty-seven degrees.

7. One *Michael Knofflog*, a marine, upwards of sixty years of age, who was dropsical in consequence of the Scurvy, died on board the *Orange Zaal*. That unhappy object had been very severely troubled with the Scurvy. He went slowly through the three stages of it, and at last, in trying to sit upon a chair and raise his body up, was suffocated. On opening the body, I found the cellular membrane under the skin, and between the abdominal muscles full of water, and between the abdominal muscles and the peritonæum, I found about three or four pints of yellow water. On opening the peritonæum, nearly the same quantity of foul water came out of the interior part of it, the intestines were inflamed, but of their natural colour, the caul was entirely consumed. I saw nothing uncommon in the liver, unless that its external appearance was of a whitish or greyish cast, as well as the spleen, as if these viscera had been macerated, I found this last full of tubercles

cles, hard and sufficiently large; when opened, they were of their natural colour. I found in the breast some ounces of water, the lungs very red and somewhat livid, and hard on touching them. The lungs on the left side adhered to the pleura, the vessels of the anterior lobes when dissected long ways were full of black blood. The external skin appear'd fleshy, the thickness of half a finger, of a red colour, not greatly unlike the liver, a bit of which being cut off about an inch or so towards the back from the lowest edge, and being put into salt water, immediately went to the bottom. All the external part of the lungs had the same appearance, except that in the upper part in the condensed skin was thinner than in the under part. In the pericardium I found four or five ounces of yellow water somewhat tinged with red. The heart was large and whitish, the right sinus and ventricle of the heart were swelled with black and coagulated blood. Besides this, I found a yellow polipose and greenish matter, which

adhered to the columns of the ventricle, and stretched itself into the pulmonary vessels. This matter adhered to the heart very strongly, and was very firm in itself when drawn out of the artery, and exhibited branches like the pulmonary arteries. On the left side of the heart, which was free from blood, I found some matter nearly the same, which extended to the aorta.

8. I observed nearly the same thing on board the *Stadt Delft*, in the body of a man who died of the Scurvy, whose legs began to swell about ten days before his death. I never in my life saw any one so severely afflicted with the Scurvy as he was, for he had all the symptoms attending it. His legs, for about three months, were as hard as a board, and yet he retained his appetite and his senses to the last moment of his life. This poor fellow, whose name was *Gerrebrand Vander Hengst*, besides the disorder he had to struggle with, had neither hammock, covering, or clothes, nor any place in the ship allotted for him,  
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for he was so lousy, that the sailors would not let him come near them. At length, by contracting his legs into a narrow compass, and bending his body, he placed himself under the smith's bench, under the hatchways, exposed to the cold and rain, and dragged on a miserable life with resignation till the middle of January, when he died. On dissecting the body, I found no water between the skin and the muscles : between the oblique and strait muscles, and between the membranes of these, as likewise between the oblique and transverse muscles, and the abdominal muscles, and the peritonæum instead of water, like that in the preceding section, I found a yellow pellucid jelly, which was so hard, that I could handle it without dissolving it. I found the same in the abdomen, but I could not touch it without its dissolving immediately. The spleen was rather hard, roundish, and of a whitish colour, and larger than is natural. In the liver, besides its being whitish and very large, I found nothing uncommon.

common. The lungs were the same as I described in the preceding section. A piece of them, on being cut off and put into water, sunk to the bottom. The sinus and right ventricle of the heart were swelled, with black and coagulated blood, and a yellow polypose matter appeared to extend to the pulmonary artery. Besides this, the cartilages of the first ribs, which are very closely connected with the breast, were in this body separated from the breast bone, so that I could easily move them any way. On dissecting the ligaments, by which they are fastened to the breast bone, a glutinous yellow matter appeared, which I found in great quantities in the joints of the knees. This matter made the cartilages of the ribs, the thigh bone, and the tibia of a yellow colour. The whirl bone had, in a great measure, lost its polish and smoothness, under the skin of the knees and legs; the cellular membrane appeared reddish, and here and there of a purple colour.

9. One *Adrian Van Land*, who had been troubled with the Scurvy the whole winter, died in harbour at *Naples*; amongst other symptoms which he had, there was one in particular which I shall mention, and that was a great swelling in his knees, and a crackling and gritting in the joints. On opening the body, upwards of ten pints or more of foul water, of a cadaverous smell spouted out. The abdominal viscera appeared white, the liver and the spleen so corrupted, that I could crumble them in my hand. The mesentery was glandulous, the lungs somewhat hard, but not so concreted as in the foregoing sections. I found a polypose matter in the heart, besides the black coagulated blood. When I dissected the capsula of the knee in the joint, four ounces of yellow, green and fœtid matter came out, which had almost entirely eaten away the cartilages of this joint, had left the bones rough and sharp, brought a caries upon them, and almost eaten away the capsula of the joint, particularly near the internal part of

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the whirl bone. There were livid spots in that part on the skin ; the rest of the skin was red and somewhat thicker in those places, than where there were no spots. The cellular membrane under the spots was a little red or livid, the internal part of the skin was of the same colour, but the more it tended to the external part, the redder the skin was.

10. On opening the body of the man who died of hunger and the Scurvy (*Vide No. 4. of this Section*) I found the caul consumed, the liver large and hard, the gall bladder swelled with black and greenish bile ; the mesentery had black and red tubercles upon it, the lungs were sound, but the right ventricle of the heart contained some black and coagulated blood, and some of the polypose matter, as in the preceding sections.

11. One *Simon Verner*, a very lazy idle fellow, who had the Scurvy on board the *Princess Carolina*, had many small spots about his knees. Having a mind to examine some of these which were livid or black,

black, I separated the scarf-skin with a needle from the skin. I was able to separate some of them very easily with the point of my needle, but I could not by any means remove many of them, though I took great pains to do it. They appeared as if they stuck under the *reticulum Malpighii*, or on the surface of the skin ; and when I searched them a little deeper, the blood burst out, so that I could not see the spots any longer. After some days, on the scab falling off, they disappeared. A blister plaster laid on, where they were numerous, removed them all. At length, the legs became red in every part, and here and there had broad livid spots which I examined after death, and I saw that they were not only in the cellular web, but in the skin likewise.

12. I opened many more bodies which died of the Scurvy, and found the lungs hard in most of them, the vessels full of black blood, some blood coagulated in the right ventricle of the heart, and the pusy matter extending as far as the greater

vessels. In those who died in a dropical state, I generally found the viscera tainted, or half corrupted, or eaten away, the gall bladder full of green or black bile, and the mesaraic glands obstructed. *Vid. Poupart's Observations dans les Memoires de l' Academie Royale des Sciences 1699*, where he mentions having found the ligaments eaten away, a caries of the bones, the cartilages of the ribs consumed, swellings of the bones, and a separation of the epiphyses from the bones. *Petit* saw the entire periosteum separated from the bones, and that in the ribs, the arms, the legs, and the wrist. *Vid. Traité des os p. 369. tom. seconde.*

16. If any one now takes the pains to consider what has been said in the enumerating of these causes, and well weighs in his mind the account which has been given of the dissected bodies, he will not find it very difficult to solve the phænomena which appear in this disorder. It will not therefore be necessary for me to dwell long upon them, but only to set forth some of them, as many manifest them-

themselves, and want no explanation. But as we cannot properly proceed to this matter, without knowing the state of the fluids, it will be necessary to recollect what has been said in the preceding section, and in the account of the general causes. For every one knows, that the above described manner of living on gross food, such as sailors eat, must generate a thick, fizzy, glutinous blood, which nature cannot throw off, and which is filled with heterogeneous particles. The blood which is taken from scorbutic patients, and the dissections of bodies which die of that disorder, not only demonstrate this, but the symptoms likewise which are observable in the first and second stage confirm this opinion, in contradiction to those, who will assert that the fluids are dissolved. It happens indeed sometimes, that in the last stage of the Scurvy, the fluids terminate in a putrid colliquation, but this seems rather the effect which depends on the continuance of the disorder than the disorder itself; for the Scurvy is confirm-

ed before a dissolution of the fluids takes place. A man is said to have a pleurify when he draws his breath with pain in his side, and has a continual fever, but without an empyema, it would be cruel in this case to make use of a wrong remedy, and instead of bleeding him in the arm, to perform the paracenthetis in his breast. Although, likewise, the best antiscorbutics are antiseptics, as Pringle has observed, such as for instance, acid and alcalefcent vegetables, and will very soon cure the Scurvy, yet this does not overturn this opinion. For roots of squills are very useful in asthmas, or in disorders which arise from a glutinous spontaneous phlegm, though in this case putrefaction has no concern with it. The same also holds good of the scorbutic asthma; brandy and other things are antiseptics, but yet do not cure this disorder. *Vid.* what was said §. 6. Nay, even the famous antiseptic medicine, Peruvian bark, does not cure the disorder if it is confirmed; it may preserve a man from the Scurvy, or when it is confirmed may stop it a little, but it will not radically cure

cure it, which holds true of many other antiseptics. But the health of the patient is easily restored by white or red cabbage, spinnage, lettuce, and turnips, and such sorts of things if boiled in broths, and given every day to the men, and these broths are serviceable in all the stages but the last, where all remedies are ineffectual. Scorbatic spots, as well as hæmorrhages, seem to favour the opinion of those who think that there is a dissolution of the fluids; but the time when they happen is to be considered; but this will be spoken of in another place. If we consider the symptoms which thwart this opinion, as for instance, the obstructions of the viscera, and those which follow in consequence, as a costiveness, a hardness and contraction of the muscles, particularly of the legs without swelling, a dry scaly skin, a swelling, redness, and inflammation of the gums, a livid countenance, and difficulty in breathing after the least motion, we shall not think them of less consequence than the others which counteract

teract this opinion. It is observable in colliquative fevers, that the patient is in a continual sweat, but in a scorbutic dissolution, the skin by its dryness becomes scaly. Why I would wish to know, should not a thin fluid pass through the skin of scorbutic people although it is moderately warm, and that yet this is the case in the last stage of this disorder, in some few instances only. Dr. Monchi has remarked in the history of the Dutch Academy of Sciences, vol. 6. §. 34. page 51, that scorbutic people sweat out a red moisture. Out of the numbers I have seen, I never saw one in a sweat, except he was in the agonies of death. If we consider, we shall find that the blood of those who have a continual fever or an inflammation, after they have lost a good deal by bleeding, is so dissolved, that no one can find blood of a thinner consistency even in the last stage of the Scurvy. Such blood is of a scarlet or somewhat yellow colour. If the drops fall upon a napkin, the spots are broad, yellow, and reddish; if it is suffered

fered to grow cold, the whole mass almost is turned into yellow serum ; on the contrary in the Scurvy, it makes a black coagulum, and small spots upon the napkin. *Vid. the foregoing chapter, No. 1, 2, and 6.* Why should not such a thin blood exude through the extremities of the vessels, and cause spots as in scorbutic people ? But the polypose matter, and the black coagulated blood which are found in the heart after death in the Scurvy, do not shew so great a dissolution of the fluids : nor did *Poupart* find in the bodies of the scorbutic patients whom he dissected, the blood fluid, but coagulated. *Vid. l'Academie Royale des Sciences 1699.* Where we read, that in those who died suddenly, &c. &c. the auricles of the heart were as large as one's fist, and full of congealed blood ; the surgeons in *Anson's voyage* found something different from this. But the places and times and the complicated disorder should be taken into this account. I found such blood once at the island of *Curacao*, where in the only man whom I  
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saw troubled with the Scurvy, his blood (when I opened his body which was still warm) ran then, but I never observed it in Europe. On which account, I gave that history in the foregoing chap. No. 6. It is from hence, that I do not approve of the comparison which Dr. Monchi has drawn in the *Harlem Transactions*, §. 39. pag. 58, between malignant fevers and the Scurvy. He deduces this likeness from the colour of the skin, and from the serum of the blood, that is, from such blood as separates no serum. *Vid. §. 34. pag. 51. of the same Treatise*; from the humour which the blisters draw, from the spots which appear in these fevers and in the Scurvy, from the stinking breath which does not come from the same cause, from the reddish sweat, or that which is mixed with blood, which no one ever observed in the simple Scurvy; lastly, from the spitting, &c. &c. But these circumstances do not corroborate his opinion, nor is it any proof, because a small quantity of mercury excites a great salivation in a scorbutic

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sweet, and yet is so dissolved, that when the patient is dead, it runs out of the mouth, nose, ears and eyes, as we shall see when we come to treat of fevers in warm climates; nor does the greenish yellow colour, which is observed on the surface of the placenta of the blood, shew that there is greater danger in fevers, for the sick, who have that kind of pellicle on the surface of the blood, get well as soon as those who have no such appearance. Nay even this pellicle, which is otherwise called inflammatory crust, may rather be considered as an wholesome effect of nature, than as a sign of putrefaction, as the treatment of this kind of fevers will evince, when spoken of below. I could produce numberless instances to corroborate my opinion, but the following will be sufficient, by which it appears.

1. That such glutinous thick blood circulates very slowly, because the fluids in such a state resist the heart too much to be driven by it to the ultimate extremities of

the arteries ; that moreover a greater quantity of such fluids is generated in the body by the daily food, for nature is so much weakened by the daily want of good juices, which contribute to the renewing of the whole mass, and the recovery of the parts which are worn away, and has so lost its due degree of cohesion and its elasticity, that it is incapable of assimilating the food, which is so necessary for the preservation of life and health ; from whence it necessarily follows, that the circulation of the blood grows slower every day ; that the fluids are with great difficulty and very slowly driven through the ultimate narrow parts of the vessels, so that the least vessels seem scarcely to receive them ; and thus by the slow circulation, the diminished elasticity, the absence of the fever and spasms, the blood passes only through the more open passages, and some of the least vessels are by degrees dilated, and others choaked up and distended beyond due bounds. It follows likewise, that they, and the excretions which depend on a free circulation

circulation of the blood, cannot operate according to the laws of nature, by which means there is an over-weight of the fluids, a retention of those which ought to be secreted from the blood, and serve the human œconomy, and of those which ought to be thrown off from the body; and at length it necessarily happens, that according to the laws of nature, if such a habit last long, that putrefaction should ensue, and in consequence death. From hence we may easily guess whence it is, that scorbutic people have an uncommon laziness, a heaviness of the limbs, and a spontaneous lassitude, a sense of weariness, &c. on which *Vide* §. 12. No. 1. where it is observed, that alertness and an inclination to moving about depends on a free circulation of the blood, and that every thing which obstructs that, must cause a weariness of the limbs. A man in health does not feel his arm heavy, but if he has a phlegmon there, he will feel it as heavy as lead, and be obliged to support it with a sling or prop of some kind. *Vid. Van Swieten*

*Swieten in Comm. upon Dr Boerhaave's Apb.* §. 1151. It may likewise be observed, that in very plethoric people, too great an abundance of good juices creates a heavy and disagreeable sensation, but in scorbutic patients, the fluids are not only peccant in quantity, but likewise in their being unable to pass along. It is not therefore very surprising, that scorbutic people should feel heavy pains all over their bodies, particularly if they move about, for the vessels are so distended by the excessive obstruction of the thick blood, that they have something like an incipient inflammation, which does not fully take place on account of the slow circulation of the blood, the absence of the fever and spasms. The hardness of the limbs in scorbutic people sufficiently demonstrates this (§. 12. No. 5.) they sometimes are as hard as a board, from which circumstance their inability to move about is easily accounted for. Besides this, the being out of breath by the least motion, and the livid colour of the face, evidently indicate the obstructed

ed passage of the fluids. For whoever observes the countenance of a scorbutic person when sitting or lying down, and is acquainted with the nature of the free circulation of the blood, in what manner it proceeds, and the causes which accelerate it; if at the same time he understands the doctrine of the fluids, and considers the phænomena which happen in consequence of the difficult passage of the blood thro' the pulmonary vessels, and looks at the face of a scorbutic person, who is doing any hard work, he will not be surprized at finding his countenance like that of a person labouring under a most dangerous peripneumony. For then the lips and face swell, the veins become conspicuous, the eyes grow full, and the whole face is livid; nor will he be surprized at these people suddenly falling down dead, for when the muscles are in action, the motion of the venal blood is accelerated towards the right ventricle of the heart. But this blood passes with difficulty through the smallest pulmonary vessels on account of its

its thickness ; and when the heart cannot soon empty itself into them, it cannot receive the blood which the venæ cavæ contain, and then the venæ cavæ, and those veins which evacuate themselves into them, are too full of blood. From hence the lividness of the face arises, the palpitation of the heart, and the difficulty in breathing. But if the cause continues, the heart is at last overpowered with the too great quantity of the fluids which it cannot force through the lungs, and is often so filled and distended, that it loses at last the power of contracting itself. The diameters of the vessels which are extended beyond nature, the sinus, the auricle, and the right ventricle, which in dissections are found swelled with black and coagulated blood, evidently demonstrate all these circumstances. *Vid.* the foregoing No. 8, 9, 10, 12, and what has been already said on Poupart's observations. It is the same case in the last stage of the Scurvy, though the fluids are then rather peccant by their dissolution, than their glutinous nature /§.

the foregoing No. 3. and 7.) for the above-mentioned state leaves so great obstructions in the lungs and concretions of the vessels, that the heart, which is weak at that time, can scarcely drive the thinnest liquid substance through the vessels. It is plain, likewise, why a fever with a confirmed Scurvy is always fatal. *Vid.* the appearance of the lungs in the preceding (§. No. 7, 8.) and likewise what *Poupart* observed, where the parts were so concreted, that they could scarcely be separated from each other.

2. Physiology teaches us, that man consists of a body and mind, and that they act mutually upon each other, tho' we know not how they act. But we do know by observation, that the clearfulness of the mind greatly depends on the due temperament of the body, particularly of the abdominal viscera, and on the due circulation of the fluids in them. For it is plain, that the passions of fear and sorrow in hypochondriac people, arise from the obstructions of the viscera; for as soon

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as a free circulation of the blood is restored in them by a skilful physician, the serenity of the mind quickly returns. *Sanctorius in Apb. Static.* has observed, that the mind is brisk and cheerful, whilst there is a free perspiration on the surface of the body; and that on the contrary, when the perspiration is impeded, the body is heavy, and the mind sorrowful. (§. 10.) But as sorrow very frequently precedes the Scurvy, and is very often a symptom of it, it is not surprizing, that these affections of the mind should increase in this disorder along with the pains and obstructions of the viscera (as will appear hereafter.)

3. It was said above, that the smallest vessels cannot receive the fluids on account of their thickness, and that appears particularly in the cutaneous vessels, for those which were before pervious to the blood, now contain only a yellow fluid, and the serous vessels carry a fluid of a thinner degree, whilst the smallest receive little or nothing, and consequently must dry up.

From hence the reason of the paleness and dryness of the skin is accounted for. (§. 12. No. 3. and 7.) But as all secretions depend on a free circulation of good blood, particularly in the abdominal viscera, which with great difficulty takes place in this disorder, it is not very wonderful, that many of the functions which are necessary to life and health, should be thereby weakened, and particularly chilification; for besides, the gastric, intestinal, and pancreatic juices which are peccant, in quantity and quality, the secretion of the bile is likewise very much retarded and diminished; by which means that biliary matter which ought to be separated from the blood remains mixed in it, and from hence the greenish yellow colour in the skin and eyes arises. The cause of the lividness in the face I have explained above in No. 1. Besides, it appears that when the secretion of the bile is badly performed, the peristaltic motion of the intestines does in the same proportion grow languid, and from thence, at the same time the desire of

of going to stool is lessened. By these means the mucus, which ought to lubricate the inside of the intestines, is neither secreted in due quantity or proper quality; from whence the costiveness is easily accounted for. But a slight swelling of the belly with a disagreeable sensation, which scorbutic patients feel in the epigastric region, sufficiently indicates the difficult and retarded circulation of the fluids in the abdominal viscera. But if the quantity and tenacious nature of such fluids are increased, and the causes which have produced this disorder continue, then the fluids which cannot pass begin to lodge in the vessels, and to produce most dangerous obstructions, particularly in the places where the passage of the blood is naturally slow and heavy. For anatomy tells us, that there is the most intricate winding of the smallest vessels in the glands, from hence the fluids being less able to pass, easily adhere to the glandular parts, and to those which, from whatever cause it may be, transmit the blood with any difficulty, as

in the scars of great wounds and in dislocations of limbs, where oftentimes through the vessels being collapsed, or the direction of them perverted, the free passage of the fluids is obstructed. From hence swellings about the neck arise with lividness, or spots, and the dissolution of scars of great wounds. But if we consider, that all the blood of the abdominal viscera becomes twice arterial, that from thence the course of the blood is very much retarded, and its passage through the ultimate extremities of the vena portarum in the liver very difficult, the reason of dangerous obstructions of the viscera will readily appear, and of their size being increased. Hence also we may account for the dropsy which soon follows, generally continues to the end of life, and is a symptom of the disorder being brought to its last stage. *Vid.* (§. 12. No. 4. and §. 13.) For besides the obstructions of the viscera in this last stage, from the daily want of a supply of new juices, and a due nourishment of the parts by the stagnation and heat of the place, and the

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natural disposition of the fluids tending to putrefaction, the humours are dissolved, the vessels are relaxed, and so distended and debilitated, that they cannot any longer contain the finest particles of the blood, which exude at the sides and extremities of the vessels in greater quantity than can be absorbed, or are corroded by the acrimony of the fluids, or so distended, that the least force breaks them, and they discharge the fluid which is contained in them.

4. The pains in the beginning of the disorder shift about, because the peccant matter is not as yet collected together in a quantity sufficient to infect the whole mass of blood equally, nor is it as yet mixed with the circulating fluids, or so firmly adherent to the parts as to resist for any time the oscillatory motion of the fibres of the vessels in which it lodges; for it easily either recedes, and is taken into greater vessels, or is in part so reduced, as to be fit for the purposes of circulation, and mix itself with that again, though it

is not rendered quite innocent, so that in a short time it may produce the old disorder, or one similar to it, if it is not entirely thrown out of the body. But if the disorder gains ground, and the fluids become more unpassable and acrid, then they are collected about the parts in which the passage of the blood is difficult, as about the bones and their integuments, and the ligaments by which they are connected, and the vessels are there distended and obstructed by an unpassable fluid. The separation of the periosteum from the bones sufficiently demonstrates this. Nay, *Petit* found even the periosteum and epiphyses entirely separated from the bones. *Traité des os tom. 2. pag. 369.* But anatomy teaches us, that the membrane which covers the bones, adheres very firmly to them by numberless vessels, which enter into them, by which means if any hindrance is in the way, where they enter the bones, then the vessels of the periosteum must be distended beyond due bounds, and are not able to resist the impulse of the fluids with so great a force, as those which lie

lie in the bone. By these means the sides and extremities being broken, they leave a liquor between the bone and the periosteum, which, by degrees, is collected in a greater quantity, and separates these two from each other ; it increases the number of the broken vessels, and at last by staying there, and by the heat of the place putrefies, and brings a caries on the bones.

But if this happens to be deeper in the bones, they swell, exostoses take place, and the fractures which have been long consolidated are loosened again (§. 14.) and the epiphyses are separated from the bones. *Vid.* the foregoing (§. No. 9, 13.) At length for want of motion, the synovia, which is naturally secreted in the joints, as well as the dew, which is found in and about the articulations, particularly of the knees, in too great a quantity, to admit of being absorbed, is accumulated, and by remaining and stagnating there, contracts an acrimony, corrodes the ligaments and cartilages of the bones, and brings on a caries of the bones themselves.

themselves. *Vid.* (§. foregoing, No. 9. and 10.) from hence the reason of obstinate and fixed pains of the gathering of humours in and about the joints, and of the crackling of the bones may be accounted for. It would be needless to say more upon this subject, as the matter explains itself.

5. Why the scorbutic acrimony should not irritate the vessels and the heart, and produce a fever, like other irritations? Whether this should be ascribed to the bodily power being diminished, or to the passions, or to the elasticity of the parts being lost, I leave to abler heads to determine. The variations which are observable in the pulse of scorbutic people, are sufficiently explained above in No. 1.

6. The reason of the spots which were mentioned when we enumerated the symptoms, appears evidently on the bare mention of them: *Vide* likewise what was said upon them in No. 12. Some large exhaling vessel (as appears from the tubercles of the goose skin) so contracted

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about the epidermis, as to be unable to empty itself, is by degrees dilated, till it becomes capable of receiving the globules of a larger size. This fluid, collected between the skin and the epidermis, becomes by degrees thicker, the thinner particles flying off, till at length the vessel is totally stopped up. The longer it remains there, the thicker it becomes, and contracts a deeper colour. But it is a long time before it grows livid. These spots are often seen in the first stage of the Scurvy, whilst the men are as yet in tolerable health, and indeed in general they appear in the legs, and about the knees, but very seldom in other parts of the body, and when once they appear, they never go away, unless the skin grows scaly. Hence arises the difference between petechiae and scorbutic spots, for those soon come out, and immediately grow red or livid, and when the symptoms grow more violent, go in again, and are frequently seen about the breast. Livid spots in petechial fevers are likewise a very bad

bad symptom; but in the Scurvy, after the appearance of these spots, men may live one or two months, and recover again by proper remedies. But as petechiæ in fevers shew the state of the fluids, and when livid, generally terminate in death, it is very surprizing, if they arise from the same cause in scorbutic people, and after the same manner, that they should live a long time with such a state of the fluids, without any danger attending it. With respect to large spots, I saw a remarkable instance of them at the *Hague*, in a soldier, belonging to a Swiss regiment, about 20 years old. One summer's day, towards the evening, his nose bled, in other respects he was perfectly well. On opening a vein in his arm, the blood came out by drops only, by which means there were not above three ounces of blood taken from him, and that was of a crimson colour, and immediately coagulated, as did that which came from his nostrils. During the time that his nose continued bleeding, a country fellow hap-  
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pened to come in the way, who said that he had a knife, in the handle of which there was a secret virtue of stopping a bleeding. He held out the knife to the young man, and told him to clench it strongly in his left hand with his arm raised, and to look at the knife. In consequence of this, the bleeding stopped, nor was there any thing further said about it, only in commendation of the virtue of this surprizing knife. The same evening he made a hearty supper, and slept well; the next day, whilst he was getting up, he saw his right hand, his arm, his leg, and almost all his right side of a livid colour. There appeared at the same time some livid spots somewhat raised, and of different sizes in his eyes and the internal part of his eye-lids. There likewise appeared in the throat, about the palate above and below the tongue, in the lips, and the ears besides the spots, some tubercles between the skin and the epidermis, occasioned by some very black blood, which was extravasated there.

there. Some of these were as large as a nutmeg ; upon this a very ingenious gentleman, *Mr. Simon Ponty*, first surgeon to the Swiss regiment, was sent for, who described the appearances to a very famous physician at the *Hague*. At last two physicians came, who ordered the whole chamber to be filled with aromatic fumigations, and sprinkled with vinegar, desired the patient, who wanted to get up, to keep his bed, and forbade any body to come near him. I afterwards attended him myself, and found the patient at home surrounded with this smoke, and only uneasy on account of the preparations which were made about him. It is to be observed, that this very soldier had taught me musick, and played on the fiddle that very morning in his bed. A little time after came a clergyman, and told him, by order of the physicians, the reason of all these preparations. On hearing this unexpected message, the sick man was wonderfully alarmed, got out of bed directly, and lamented

mented very much that he must be pronounced a dead man, when he was so well, that except these spots and tubercles, he was in fact very hungry. The clergyman ran down stairs, lest this pestiferous person should come too near him. Some of these tubercles broke the same day, and when broken, discharged some black and coagulated blood, by which means in a few days, without any assistance, the man was quite well, for as to medicines he would take none, so that on the fifth day he went about his busines, which he might just as well have done the first, if he had not been ordered to the contrary. I saw another equally extraordinary case in a very stout sailor, one *Simon Wiertz*, on board the *Princess Carolina*. One evening some livid spots made their appearance without any pain, some of which on his legs were at least the diameter of three fingers; he was at this time in perfect health, he ate and drank, played, and did his accustomed duty. But in about eight days after, his whole body grew

grew yellow as wax, and that likewise without any pain. I ordered him to drink plentifully of ptisane, made of the five aperient roots and liquorice twice a day, he took a cup full of Rhenish wine, in which some *herb. amar.* vitriolic tartar, and steel filings were mixed, every night he took a pill of Venetian soap for three weeks, and at the expiration of that time, he recovered his usual colour. But I do not take upon me to say, whether these appearances arise from a dissolution of the fluids, or a relaxation of the vessels, from too great a quantity of blood, or from some unknown cause: but it should seem, that the tubercles in the former case arose rather from the blood, which discharged itself from the broken vessels, than from that which exuded from the extremities of the vessels, though both circumstances may be the case. For a lividness arising from a contusion, or such as is observable in women of a tender frame, after any slight compression, which is verylike scorbutic spots, does not arise from an exsudation

dation of the blood through the extremities of the vessels. But there is no doubt, that scorbutic spots arise from either the one or the other cause, namely, from the blood which is discharged from the smallest vessels being broken under the skin, and between the muscles, or from its exuding from the extremities of the vessels being relaxed. *Vid. §. 13.* and the dissection No. 10, 12. But I cannot, for my part, conceive how the cuticular vessels in particular should transmit the blood through the extremities, and that, yet it should not be the case in the intestines, though the intestinal vessels are more open and weaker than those of the skin. Nor have I ever found in the bodies which I have dissected any spots in the intestines. If the blood was discharged through the extremities of the vessels, then the urine and fæces would be tinged with blood, which does not happen, except in the last stage of the Scurvy, though there may be such appearances for many months perhaps on the legs. Nor do all scorbutic patients die

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with a dysentery or hæmorrhage, for the greatest part of them, before they arrive to that state, die by the circulation being stopped. *Vid. No. 1.* of this section. And the others as frequently die dropsical in the last stage of the Scurvy; certain it is, that scorbutic people are very liable to a dysentery; but then, at the same time such causes appear as would, independently of the Scurvy, be sufficient to produce this disorder; it is therefore no wonder, if scorbutic people should be affected with them, that they should likewise be troubled with the dysentery. In bodies which have died of a dysentery, the intestines have been found black, but this blackness has no connection with the scorbutic spots, for it is a true gangrene. And it appears from thence, that the blood which is found in scorbutic people under the skin and between the muscles, and constitutes the scorbutic spots, comes from the vessels being too full, and from their being broken by the motion of some muscle, and discharging the blood contained in

in them. But if the disorder arrives at its last stage, and a putrefaction from the above-mentioned causes succeeds, and the vessels have lost all their elasticity and cohæsion, then a dysentery and the spots may arise from both causes, from a rupture of the vessels, and from an exsudation of the corrupted fluid through the extremities of them. From what has been said, the reason of hæmorrhages being common in the last stage is very obvious, and requires no farther explanation,

7. It remains now to consider what causes conspire in producing a more copious excretion of the saliva than usual, which is very common in the Scurvy : and whether it can be compared with the flow of the saliva which is produced by the unguentum Neapolitanum, which I very much doubt of, although a small quantity of mercury produces a strong salivation in scorbutic patients. For it is seldom found to be so plentiful in the Scurvy, unless it has been produced by bad treatment, as Mr. *Yves* has observed in Dr. *Lind's*

book. Moreover the saliva is produced so easily in some men, that they not only in a short time excrete a great quantity of it, but can scarcely ever open their mouths without some of it coming out, though they have not the Scurvy, or have not taken mercury. Besides, all acrid particles holden in the mouth occasion it, as tobacco, &c. &c. We have already remarked in enumerating the symptoms, §. 13. that great chewers and smokers of tobacco are more liable to this symptom, than those who seldom or never use it, but no one doubts that this odious custom gives occasion for a more copious discharge of the saliva, particularly by chewing, for the glands are drained by the continual motion of the jaw, the tongue likewise is perpetually used, that the bits of tobacco which lie in the remote parts of the mouth may be collected into a quid, and chewed again. It appears from thence, that this custom prepares the way for a more copious secretion of the saliva, because nature by degrees will accustom herself to this evacua-

evacuation. But as in this disorder, through the obstructions of the vessels and the glands, some fluids are not secreted in due quantity, such as the gastric and pancreatic juices, &c. from hence a greater quantity of them is collected, and in an unusual manner carried to the secreting organs of the saliva; and if they are open, from any cause whatever, they are secreted more plentifully through them, and evacuated into the mouth. Besides all this, a swelling, a slight inflammation, and ulcers of the gums as well as pains in them, call the fluids more to the affected parts, and from thence, in many disorders of the mouth, men spit much more than usual. These seem to be the causes of the flow of the saliva in scorbutic patients. But the reasons why the gums separate from the teeth may be better known from what has been said in No. 4, of this chapter. The reason of the weakness of the teeth is likewise obvious, for it is very well known, that the teeth do not adhere to the jaw,

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but as the vessels by which the gums adhere to the teeth, are in this state separated from them through the circulation being stopped, and the membrane which covers the internal part of the sockets is at the same time swelled, the teeth are by those means freed from their holds, and at length fall out. With respect to the stinking of the breath, *Vid.* No. 8.

From what has been said, the nature of the disorder, and the real state of the fluids as well as of the solid parts, is sufficiently obvious. The Scurvy therefore seems to be such a depravation of the fluids, as arises from a want of daily renewal of good juices, and from a bad assimilation of those which are every day taken into the constitution; the due elasticity, motion and natural heat of the vessels and the viscera being defective, by which means a thick glutinous blood, filled with heterogeneous particles badly digested, unfit for the purposes of nutrition, and very apt to produce obstructions, is generated

rated in the body, the functions likewise are weakened and putrefaction follows.

18. But although this disorder is a very terrible one, and affects seamen very severely by its most excruciating symptoms, it still admits of an easy cure, if proper remedies are applied in time, that is, before the viscera are touched. Now, tho' sailors are very much in want of these, particularly at sea, yet such remedies may be found on board of men of war, as may retard the effect of the disorder, if not totally cure it, and so stop its progress, that the men may be preserved, till they come with the ship into a proper place, where they can get at such helps, as will entirely remove the disorder. From thence arises a double method of cure on board of ship, viz. a radical or a palliative cure, which will be spoken of in the two following sections. But before I speak of the cure, I must premise, that many famous antiscorbutic remedies are found in different authors, many of which I have purposely avoided

mentioning, though very excellent, because few if any of these can be procured on board of ship. On this account I rather chuse to refer my courteous readers to the authors on the subject, if they have any occasion to undertake the cure of this disorder on shore, where every remedy may be had which is requisite for the purpose. For it is sufficient to mention how it should be treated on board of ship, where few such remedies can be had.

19. As in other disorders, so likewise in the Scurvy, attention should be paid to the causes which have produced it, and from them the indications of cure are to be sought for. And here there seems to be four subordinate general indications sufficient for the perfect cure of this disorder. In the first place, such food should be given them, as they may be supposed to have long wanted, namely, fresh meat and herbs. 2dly, Cloaths, and such coverings as may cover their body, and keep it in moderate warmth. 3dly, Moderate exercise according to the strength  
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of the patient. 4thly, To counteract very urgent symptoms with proper remedies. Now the first indication on which the whole cure of this disorder depends, is answered, if fresh vegetables are administered to the sick, which will soon remove it. Nay, if this assistance can be procured, a physician and physic are unnecessary. It appears from thence, that the cure of this disorder, as *Lind* has very well observed, is not a work of very great skill, but is easily completed. For this purpose, different kinds of food may be given, amongst which, broths made of fresh meat with vegetables in them, are particularly serviceable, such as cabbage, lettuce, endive, succory, spinach, sorrel, chervil, parsley, particularly leeks, onions, chebbals, rape roots, turnips, carrots, &c. &c. Those which are cheapest in this way may be picked out. If meat is too dear, they may be dressed with butter. Thus onions may be dressed with rice and butter, then apples, pears and plumbs, &c. &c. with rice, barley  
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and sugar, rice, millet and barley, with lemon and orange juice fresh squeezed, and things of a similar nature. Milk and whey are very wholesome in all stages of this disorder, particularly for people in a weak state. Besides this, every thing which can be eaten raw, as apples, pears, grapes, &c. salads, radishes, &c. &c. These generally cure the Scurvy, and generally can be procured, for there is hardly any port where these cannot be had. In the last voyage which I made in the *Mediterranean*, some of the marines had been troubled with the Scurvy before we left Holland, so that when we came to the harbour of *Malta*, the disorder gained ground so much, that it had passed the middle stage. Being desirous of preventing dangerous consequences, I bought in this island some water melons, and other melons, which I distributed in shares every day to the sick on board, and which they devoured with the greatest eagerness. I continued this about ten days with surprising

prizing effect, for on the fifth or sixth days, the livid spots on their legs looked kindly red, their legs softened, the swelling and ulcers of the gums disappeared, their countenance looked pleasant, and the men, without any other remedies, were totally recovered. But the complete cure of this disorder is sooner brought about, by adding one or two glasses of red or white wine, which is always at hand, or of small beer. Cyder is very good, but cannot be had in Holland, as likewise spruce beer; how this is prepared, may be seen in Dr. Lind's book. I have sometimes seen captains in voyages which I have made, instead of bacon and pease, supply the whole crew with very wholesome food, made out of fresh meat and different sorts of vegetables which they call *poeaspas*. But I think it would be better, if it were only given to the sick, for five or six dinners, or ten at most, are of very little consequence to those who are well; whereas if this food was well preserved, and given to the sick on board, it would save many lives,

lives, and restore them to perfect health. The second indication of cure might very well be completed, though it never is, for I never made a voyage, in which I did not see many disordered, nay even some lives lost, merely through the want of proper cloaths and coverings, so that I may venture to say, that half the men who were sick, would not have been so, if they had been well cloathed. Nay, though no one would credit it who had not been present, it may be asserted, that the want of cloathing produces sickness more frequently, than even the sailors general food. With respect to myself, in the voyages which I have made, I found it impossible to manage this matter for the sailors, though I generally could procure a little food for them from the captains, but for cloathing, I could seldom or never get any which was proper for them. Nor is it an uncommon sight, to see men walking upon deck in the middle of winter, though bitterly cold, covered only with ragged linnen cloaths, and often even without shirts, so that

that their skin may be seen in many places. In this trim they often sleep upon the floor, or on some chest, for they are generally in want at the same time of bed and bedding ; nor do I remember to have seen a single man taken off by the Scurvy, except one or two old men, who might not ascribe his death principally to that cause of being unprovided with cloaths and coverings. If I ever asked for cloaths for them from the captain, I was sent to the steward, who sometimes would give me a shirt for them, or a pair of very thin linnen trowsers, but very often nothing, for he did not dare to depart from rule, as they had already received all the money that was due to them, so that these unhappy wretches, who might for a trifle have been saved, necessarily perished, and that, frequently through the bad management of their affairs, even before they left their country. *Vide Preface, §. 5. chap. I. part. 2. No. 7.* How this may be prevented with very little expence, will be explained in the fourth part.

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In the third indication, moderate exercise, according to the strength of the patient, is necessary. I have already explained what effects it produces in the body, so as to prevent or cure this disease. But the evident danger which there is in a scrofulous person working too hard, and how cautious a surgeon ought to be in preventing that, appears from §. 12. No. 1. and §. 16. No. 1. Hence it is proper, that before the men are set about their work, as is usual on board of ship, the surgeon should know the present state of the sick, and order their work accordingly, lest they be suffocated by the circulation being too much accelerated. At the beginning of the disorder, the men are able to bear all kinds of hard labour and exercise, except those of the severest kind, which require a man's full strength; but as the disorder gains ground, the exercise ought to be less, and that as much as possible in the open air; and they should every day get upon deck and walk there, for if they neglect it at first, in a short

short time they are rendered incapable, and cannot be brought into the open air without danger of suffocation: from whence it appears, that if they have been any time below, it is very dangerous to let them come upon deck, though they may appear strong enough, for many of them die, if they are carelessly brought into the open air, which has greater weight and elasticity than that to which they have been accustomed. But if their disorder is so violent as to oblige them to keep their beds or hammocks, or if they have been confined there on account of some wounds, then the patient should be placed with his hammock upon a piece of wood, whose extremities are supported by ropes fastened to the upper deck, or the extremities of the piece of wood may be put upon two guns, and then by the rope being fastened to the middle and lower part of it, such a swinging motion may be produced, as the patients may very well bear, and in this case indeed it is the best kind of motion, and very judiciously recommended

mended by Dr. *Lind*. But if the scorbutical people should from any accident be obliged to remain below, and cannot get upon deck, which often happens through the inclemency of the weather, then such exercise should be contrived for them as they can take there. But if the disorder is in its last stage, all kind of labour should be avoided, for they cannot bear even the slightest without danger of suffocation, and their only chance must lie in meat broths, and milk, drank frequently in small quantities. A little good wine with lemon and orange juice, and sugar taken by a spoonful at a time, till the strength is a little recovered, is very good ; then the extremities of the body should be rubbed gently with the hand, or a piece of cloath ; when they can bear that friction, they should be placed on a board ; then they may get up, and sit upon the chest, but it would be better if that could be done in their hammocks, though that is not easy, the deck being so near above them. But if there is a necessity for  
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the patient's getting up, the hammock should be unloosed, and let down at the feet by degrees, and then the matter is easily managed. Afterwards they should be accustomed by gentle degrees to stand on their feet, and at last to walk, and particularly should be led towards the stairs, that they may be gradually accustomed to the air, which has greater elasticity than that which they were used to; all which is easily done by keeping them a little about, and upon the stairs, and then if their strength permits, they may be carried upon deck, and by degrees be brought to move about. This precaution is of very great consequence, when the patients are carried on shore from the ship, as many of them die suddenly, who might otherwise have been kept alive. According to *Lind*, the intire cure of the Scurvy is for the most part completed according to these three indications, if the disorder has not arrived to its last stage. With respect to the fourth indication, that shall be the subject of the following section, in which I pro-

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pose speaking of the method of preserving the men from this disorder, and the palliative or maritime cure of it.

20. It is now to be considered, how we are to combat this disorder best at sea, if the helps to an entire cure in the first indication are wanting, and how to cure it when begun, and last of all, by what remedies it is to be counteracted when it is confirmed, and the symptoms are more violent. By which it will appear, that there is more requisite for this palliative or maritime cure, and that there is more difficulty in it, than in curing the disorder entirely on shore, as many of the best remedies which may be procured in harbour, are very often wanting at sea. But still it is not impossible to cure the Scurvy at sea, at least if not to cure it entirely, yet so to weaken its force, and that with very little expence, as to be of no dangerous tendency. But as it is impossible, that sailors should have such food as is prepared from fresh vegetables, which experience tells us, will preserve them from the

Scurvy,

Scurvy, or cure them when they have it; another method is therefore substituted, by which means vegetables may be kept fresh on board of ship, and the sailors may every week make one or two dinners on them, such as pickled cabbage, beans, onions, &c. &c. These, because they are dearer perhaps than the accustomed food, are not taken on board, or because a greater quantity of them is required than would be sufficient for a whole crew, for one or two dinners every week, and perhaps because they cannot be procured at all seasons, at least in such quantities as are requisite, when in the mean time, the ships are forced to go to sea at all times indiscriminately. Besides, they take up more room than pulse and bacon, which can be put in chests and casks, and placed in any direction without damage to the contents, which cannot be done with the casks, in which the red cabbage or other pickled vegetables are put to keep them good, as the top should be always kept covered with pickle, otherwise they are soon

rotten. It may moreover be objected, that if they are kept too long, particularly in the warmer climates, they may spoil, as is the case sometimes with those which are put on board for the use of the captain and officers. Lastly, if there were a great quantity of them in the ship, they might infect the air with their fætid exhalations, by which means worse consequences might ensue than those which attend the Scurvy. These may be some of the reasons, why they are not more commonly used, though so extremely serviceable. But if we consider attentively the present situation of sailors, in those respects which concern their manner of dieting, if we narrowly examine into the causes which produce this disorder, and who are most liable to it, it will appear very clearly, that there is a necessity for these pickled vegetables on board, and that if the men eat them occasionally, they will live not only one or two months, but even a whole year without being greatly prejudiced in their health. For just in the same

same manner as the petty officers, the good sailors, the good marines, the rowers and the boys, preserve themselves free from the Scurvy, just so would the slothful and inactive, the aged and the weakly, be able to keep themselves from the violence of this disorder. For the aged may be restored, and those of a weakly constitution be supported, at least till they come to a proper place to gain a final recovery by that food, which is generally given to the patients on board, by one or two glasses of red or white wine occasionally, and by those remedies, whose effect is known by certain observation to be equally specific, as well in preventing, as in curing this disorder. By these means, then, the first indication of cure, as mentioned in the preceding section, is in some measure answered, although, perhaps, not quite perfectly. Perseverance, however, must succeed at last; but those remedies which are required in the second and third indication of cure, mentioned in the preceding section, never putrify or grow sour, and

may always be had, as will appear hereafter; the following numbers will shew how, and by what remedies these good purposes are best answered.

1. Besides the usual remedies which are generally to be met with on board of ship, some whose efficacy is known and undisputed, which lie in a small compass, and are not the worse for keeping, present themselves to our notice. Amongst these are principally inspissated juices of oranges, citrons, or lemons. The way in which Dr. *Lind* prepared them is very well known. By these alone, the Scurvy may be cured almost. Juices of the same saponaceous and subacid virtues, may also be prepared after the same manner out of apples, plumbs, grapes, currants, &c. and experience shews us, that these will likewise cure the Scurvy. These fruits when dried may be used for the same good purposes; squills likewise and their preparations, onions and garlick, and anti-scorbutic wines, which may be very easily made on shore at the seasons the anti-scorbutic

scorbutic ingredients are to be procured, and are as conveniently kept a long while good at sea.

2. Men of weakly constitutions and convalescents from fevers, and other disorders, are likewise prevented from having the Scurvy, if they are treated properly in the first disorder, and are not put too soon on the common sailors diet, and to hard work, at least not till they have recovered their strength. Whilst they are recovering, besides eating innocent food, they should drink one or two glasses of wine, and have a proper place allotted to them to hang their hammocks, where they may sleep comfortably. If any severe disorder has confined them to their beds any time, and through inattention they are very lousy, and cannot be cured by powder of Staves-acre, then their cloaths, their coverings, and their hammocks should be put into the oven, after the bread is taken out, as the lice and nits are easily destroyed by that method. For it is observed, that vermin, by break-

ing the rest of the sick, greatly retard their recovery. But in the day-time, when their strength will permit, they should exercise themselves in the open air. Besides this, the present and past state of health of the patient should be taken into consideration, in order to know whether medicines can be of any service. By these means the men may recover their health on board of ship as well as on shore. In the same manner as weakly people are preserved from the Scurvy, so may the aged. But those who have been accustomed to the sea, do not so easily contract the Scurvy, and it is often sufficient, if they have a good comfortable place to sleep in, particularly under the hatchways. And if not, a draught of wine now and then, or a little gin, raises their spirits most surprizingly. But the old men who are not used to the sea, are soon attacked by this disorder, and it is with great difficulty they are preserved from it. On this account, besides what we have prescribed for the weakly men, it would be proper for

for them to put some of the above-mentioned juices, particularly orange and lemon juice, into some red or white wine, or beer; or if these juices are not at hand, a drachm of extract of Scurvy grass in some ounces of *Aqua Raphani*, or a few drachms of the *Tinctura Aromatica*, according to the London dispensary, or some ounces of stomachic tincture, according to the Edinburgh dispensary, with wine, or in the morning a glass of bitter, or antiscorbutic wine or ale.

We should likewise try, as much as possible, to excite perspiration in them, for which purpose many remedies may be given, as decoctions of sudorific roots, woods, herbs, and seeds; infusions of aromatic herbs, and tea drank warm: water gruel with lemon or orange juice, or vinegar and sugar is very proper, particularly if the patients have warm coverings, and they take it in the evening in bed. Instead of this gruel, three or four ounces of an aromatic infusion, with rob of elder, are very salutary, with an addition of a bolus made

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of theriac. *androm.* with flower of brim-stone and camphire. I have often used with success draughts prepared of alkaline salts, neutralized with wine, lemon juice or vinegar, as also boluses made of the powder of contrayerva, Virginia snake root, camphire, *sal. volat. cor. cervi.* with Venice treacle. If they can get at onions or garlick, they may sometimes eat of them; for Dr. *Lind* observed, that they who ate of these, particularly onions, never contracted the Scurvy. I saw a marine on board the *Stadt Delft*, one *Lewis Charpartier Hulfern*, who was so avaritious, that he would not buy any thing for himself, though he had money enough, who was seized with the Scurvy, his gums were ulcerated, and his knees swelled. I advised him to buy some fresh bread, some wine and some fruits, but because they were too dear for him, he desired to have some pounds of bread, and some garlick from *Cadiz*. He rubbed his bread as long as it lasted with garlick, and sprinkled it with salt.

salt. He did the same with his biscuit. With these and such like helps which he had from me, which could not be many (for the provisions which I had in my own possession, I gave to those who were not able to buy for themselves) he entirely recovered in twelve or fifteen days : then I bought some garlick myself, and offered it to those who had, or were inclined to have the Scurvy ; but they would not eat any of it, as they thought I did it to save the expence of other remedies ; I put the garlick into another form, I took five drachms of garlick, half an ounce of the roots of squills, and beat them well in a stone mortar : I added to them a drachm of camphire, dissolved in oil of aniseed or mint, a drachm of *sal. volat. cor. cer.* six drachms of contrayerva powder. These I mixed well together in a mass for pills, of which I gave twelve or twenty grains morning and evening, with very good success, for by that remedy, I excited a fine perspiration, particularly if, when they took the pills, they drank

drank some aromatic infusions, or some warm tea. But if, through want of cloathing, they could not perspire, it then went off by urine. I have observed, however, that this remedy sometimes caused a slight fever for a few hours, or that the pulse was quicker, but this never hurted the patient unless in the last stage, when it produced very violent anxieties ; it must therefore be given with great caution, and in very small quantities. By the above course, I have not only preserved many from the Scurvy, but have also cured a great many who actually had it.

3. Any one who attempts to cure either a beginning or a confirmed Scurvy, or when in the last stage, besides the medicines mentioned in this and the preceding section, should consider attentively, what are the symptoms which are most violent. I shall therefore now treat of them, and in the first place of the want of stools. But as in this disorder, it is only requisite that the body should be kept gently opened, purging medicines should very seldom

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be used, as the patients cannot very well bear them, though they are recommended by some authors. The same may likewise be said with respect to vomits, for I have had many scorbatic patients, but I scarcely remember to have seen six who wanted that kind of assistance. But it appears from the very nature of the disorder itself, that resolvent saponaceous, and gentle loosening medicines must contribute to this end ; for experience tells us, that by the sole use of fresh vegetables, the body is for the most part kept open, and that when they can be had, no other medicines are requisite. But if the body is so bound, that vegetables will not relax it soon enough, or if they cannot be procured, as when at sea, then gentle loosening medicines, and such of them as come nearest to the above-mentioned ones, as the inspissated juice of plumbs, grapes, or decoctions of these fruits, and currants, may be mixed with their daily food. If these are not strong enough, a little cream of tartar may be mixed with them, and a little common honey

honey or manna with it. Cassia fistula and tamarinds, if they can be procured, are not less serviceable. If still stronger than these are wanted, agarick, senna leaves with wormwood tops, Epsom salts, sal Polychrest, sal Prunella, vitriolated tartar, &c. &c. may be given. These not only gently open the body; but likewise operate strongly by the urinary passages. But in the mean time the state of the viscera should as much as possible be attended to, that an equal circulation may be promoted in them by gentle resolvent saponaceous medicines. For this purpose *tinctura mart. ludov. elixir proprietatis*, acalefent salts, *sal. volatil. oleos.* may be given; besides these, I have frequently prescribed, with good success, some drachms of Venetian soap alone, or mixed up in the form of a pill; oxymel of squills is likewise of very great service, as are many other medicines which are found in the Materia Medica. But care should be taken not to apply too strong and acrid remedies in the last stage of this disorder; for then  
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the gentlest medicines should be sought for, out of the vegetable kingdom.

4. In the asthma, or where there is a difficulty in breathing, squills and their preparations are the most efficacious. An ounce, or an ounce and a half of oxymel of squills, taken in a proper liquor in this case, always relieves the patient.

5. But if the disorder has arrived to that pitch, that the patient voids by stool either pure blood or bloody water, then there can be scarcely any hope of recovery remaining; especially if this symptom shews itself at sea, and in the last stage of this disorder. But if the ship is in harbour, the patients very often recover, particularly if the disorder has arisen from a general cause, as is frequently the case on board of ship, namely, that both diseases rage at the same time, and then it attacks as well those who have the Scurvy, as those who have it not. But those who have it, may be affected in all the stages of the disorder; and if it happens, that a dysentery seizes the scorbutic patients

tients whilst they are tolerably hearty, it is a sign they are not in so much danger, and therefore it should be treated at a dysentery. With respect to this particular case, the proper authors may be consulted, and the reader is referred to what is said in the following section, and the third part of this Treatise. It should be remembered here, that fresh vegetables, mutton broths, boiled milk, or mixed with hot water, if these can be had, are very excellent remedies for scorbutic people. After which, strengthening, gently astringent, and diaphoretic medicines should be used. But if this symptom arises from the Scurvy alone, which indeed seldom happens, except in the last stage, then it may be looked upon as the forerunner of death, and in this case all the remedies I ever gave proved ineffectual. Neither rhubarb with theriaca and diascordium, nor alum, nor mineral acids, according to Dr. *Lind*, nor powder, nor infusions of ipecacuana, were ever of any service. But in a few days after

after the appearance of this symptom, the patient died.

6. But if the Scurvy has continued any time, the dropfy generally follows in consequence, which symptom, like the dysentery, generally occasions the death of the patient. But if it has not continued any time, and the abdominal viscera are sound, it generally yields to the common method of cure. If the belly swells, and the legs are œdematos, after a recovery from the Scurvy, and the patient is strong enough to bear it, then the extravasated fluids should be drawn out by the proper outlets, and recalled from the wrong course which they had taken, by which means the vessels will at length recover their usual tone. How that is best effected, may be seen in the authors who have written on the dropfy, for there is nothing particular required in the treatment of it here.

7. It remains now to speak of the symptoms which require external and internal applications. And here first of all, pains are to be considered. These are either wandering or

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fixed. The last of these seize indiscriminately the soft or hard parts, sometimes with, or without, a swelling. But although they are produced by one and the same cause, yet through their long duration, and the difference of the parts which they attack, they require a different method of treatment. But the pains which affect the soft parts and sometimes the hard, generally yield, when there is no swelling, very easily to the common method ; namely, proper diet and diaphoretic remedies. Yet it is sometimes observable, that they are so obstinately fixed to the parts, that the sick are not relieved by the general method of treatment. In such a case, oxymel of squills is very serviceable. When the pains did not yield to this remedy, I gave Peruvian bark in small doses, but often repeated ; afterwards, when I found the sick could bear it, I increased the dose, and very often with the happiest success. When I found they would yield to no remedies, then I ventured to put large blisters to the parts which were affected,

fected, if they were above the knees, for I always avoided putting them on the legs, because ulcers are cured with much more difficulty in those, than in other parts of the body. By this method I sometimes did in one night, what by others I could not accomplish in ten days. Although I have used this remedy very frequently in different parts of the body, I never found a gangrene ensue, the fear of which prevented Dr. *Lind* from making use of them. But if the parts swell, though they keep their natural colour, we should proceed in another manner; namely, if the pains affect the soft parts, they should be rubbed occasionally every day in a warm place with the hand, or a piece of cloth, and afterwards apply a fomentation which will resolve the glutinous fluids, and give the vessels their due tone. The fomentations are made of the flowers of elder and of melilot, of rosemary leaves, wormwood, water germander, rue, &c. These must be boiled in a sufficient quantity of water; to three pints of this decoction, add one

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pint of the strongest vinegar, and three drachms of sal. ammoniac, or instead of the vinegar and salt, two ounces of Spanish soap. These are applied warm to the part with cloths, or which is still better with flannels: in order to this the saponaceous liniment, according to the London dispensary, may be added. But if the pains have been long troublesome about the bones and joints, and the humours about them are extravasated, whether between the bone and the periosteum, or above the capsula of the joints, or in the joint itself, as it often happens about the knees, then a passage should be made by an incision for the extravasated matter, before it corrodes the circumjacent parts, and forms a caries in the bones. I have done it myself sometimes with good success, but yet I must confess, that such a collection of matter can seldom be discovered soon enough, because it forms very slowly, and always lies very deep in some part that is hard and swelled. From hence we may account for the bad success of the operation,

ration, which is almost always undertaken too late ; namely, when a caries is already formed in the bones, but if other circumstances seem to promise a cure, the chirurgical operation should be tried ; for as *Celsus* says, it is better to apply a doubtful remedy than none. How ulcers with or without a caries, or other disorders of the bones are to be healed, may be known from surgery. I shall here only mention what is of service, or prejudicial, that the one may be used, and the other avoided. All fat, oily, relaxing applications to the wounds, are very prejudicial ; on the contrary, spirituous, balsamic, astringents, particularly those of alum, are very serviceable. Peruvian bark should never be omitted in great wounds or ulcers, but always given in great doses. This also should be remembered in all capital chirurgical operations on board of ship, whether on scorbutic patients or not ; for very often in scorbutic ulcers, a laudable suppuration and healing is produced by the sole assistance of bark. But in those

who have not the Scurvy, when given in a less dose, it not only produces the same effect, but also preserves them from the Scurvy. I could mention here, if I had time, many remarkable instances of patients cured by this salutary remedy alone, but I shall only mention a few out of a great number, and first of all, one of a fracture of the ulna and radius, in a soldier on board the *Stadt Delft*, called *William Murs*. I kept them, by a proper bandage, for eighty days in their due position, but at the expiration of that time, the bones had not yet formed a callus, but excepting the swelling, were exactly the same as if they had been broken that very day. By the help of Peruvian bark, in sixteen days, they formed a callus: this man had been troubled with the Scurvy before this accident. There was an old man, one *Peter de Graaf*, on board the same ship, who had the Scurvy, and had accidentally received a violent contusion upon his leg about the external ankle bone, in consequence of which a gangrene ensued.

sued. I ordered it to be scarified, and applied several other remedies, which are generally used on these occasions, but all to no purpose. In the mean time the disorder gained ground, but on throwing in the Peruvian bark in large doses, often repeated, not only the gangrene stopped, but in a few days the skin, the cellular membrane, and every part of the muscles which was affected, was separated from the foot; the large ulcer was surrounded with a laudable pus, and the part at length consolidated. *John Crusaf*, a marine belonging to the *Stadt Dordrecht*, having a violent Scurvy, and being brought from his ship to the hospital at *Rotterdam*, stayed there some weeks, and then upon his recovery went on board the *Princess Carolina*. In one or two days after this he had the misfortune to fall from the upper deck into the kitchen. I trepanned him in several places; four or five days after the trepanning he recovered his senses, but his tongue continued paralytic. A sanguous matter only came from the wound; in about

thirty days, his gums began to swell, and to be ulcerated. On giving him the Peruvian bark, he recovered the use of his tongue in a few days, his ulcers discharged a good matter, were perfectly sound on the seventy-fifth or sixth day, and he was entirely free from the Scurvy. One *Henry Lugterhoof*, was seized with a fever the sixteenth day of September, in the harbour of the island of *Curacao*; this fever had raged epidemically on board of ship, of which more hereafter. I gave him a large dose of Peruvian bark, which in four and twenty hours entirely removed the Scurvy, but left a great pain in his loins on the left side, by which his leg was a little paralytic. At first I ordered an emollient clyster, and an emollient fomentation on the part which was affected. I afterwards ordered a warm one, and the part to be rubbed, and some blisters to be put on, but all to no purpose; the pain increased, and a numbness seized the whole left leg, which at last grew œdematos. About the end of October, the œdema increased

increased so much, that not only the leg swelled most surprizingly, but it seized the loins and the back up to the shoulders, then the face and the right leg were also slightly swelled. All this time he enjoyed a very good appetite; his breast and his belly were not disordered, and he made but very little water: at last, through the violence of the pain and the swelling of his back, he was obliged to lie upon his belly. I often examined his back and loins, and they pitted very much, but I observed nothing else particular. In the month of November his gums swelled, and he began to have the Scurvy: in the beginning of December a large swelling rose on a sudden in his loins on the left side, of which there was no appearance the day before; when I cut it with my knife, an astonishing quantity of thin greenish matter issued out, which ran for a whole day and a night. Upon which the swelling and pain in the leg and loins abated considerably; this matter quite overflowed the muscles of the loins and leg, and when I pressed the thigh, some matter

matter came from the bottom under the membrane which covers the muscles of the loins ; on which account I was obliged to make many great incisions in the back, the loins, the buttock, and the thigh about the knees, that I might open a passage for the matter. All these had a communication with each other ; the patient was very much weakened, the matter continued thin, the swelling of the greater part of the left leg, of the loins, back and face, and right leg abated entirely. In the mean time I threw in the Peruvian bark, by which means the matter thickened, all the incisions were closed up in the month of February, and the man was able to walk about. In the middle of February, he returned home to Holland entirely free from the Scurvy. It appears from all these instances, of how much service Peruvian bark is in this disorder, and how much it contributes to healing scorbutic wounds. But besides these, there are considerable ulcers sometimes which are called scorbutic on board of ship, and arise

arise from slight contusions and little wounds, nay even from scratches of the skin, particularly in the legs, though the Scurvy has less to do in the production of them, than the very curing of the wounds. This only holds with respect to the legs, for in other parts of the body, ulcers are as easily cured on board of ship as on shore. But the reason why ulcers in the legs are so difficult to be healed, is because the sick pay no regard to the surgeons, who order, that those who have wounds in their legs should keep their bed, and because the surgeons use plaisters too much, and those too large, when they can hardly ever be used without detriment, for they not only shut up the corrupt matter in the ulcers, but also hinder perspiration where they are applied. Besides this, the acrid matter is retained between the skin and the plaster which softens the skin, and causes an erysipelas and pustules. Sometimes the astringency corrodes the skin, produces small ulcers, which are treated like the large one, and thus in trying to cure one, they occasion

fion many more. All this mischief may be prevented by keeping the wounds clean, in the room of plaisters, covering them every day with scraped lint and linnen bolsters, which may be fastened by a proper bandage. This should be made of clean linnen, and by this method many plaisters may be omitted, which are of more prejudice than benefit. The sick should likewise be enjoined to keep their beds, or to sit with their legs in an horizontal posture; by these methods those ulcers may be cured, which are generally deemed incurable, and commonly last the whole voyage, and thus prevent the men from doing their duty. Besides these, there are dry and moist wounds, as above mentioned, §. 13. To what has been prescribed for the cure of wounds, may be added for the cure of these dry wounds, ointment of styrax, and arceus balsam. But if funguses grow out from the moist wounds, they may be kept down by astringent remedies and a light pressure. But care should be taken, for fear of too great

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a pressure occasioning a gangrene; with respect to the cure of wounds in general, application must be made to surgery.

8. When the Scurvy is cured, if a contraction in the legs continues, the contracted muscles should be rubbed with the hand in some warm place, and the legs fumigated with aromatics, or vinegar. For this purpose, they may likewise be held in a vapour procured by boiling emollient, resolvent, and aromatic herbs in water, to which may be added a little spirits of wine and vinegar. But it would be better if the patient would move his legs about as much as possible, when he begins to find a stiffness in those parts, for by that motion alone, he might prevent this symptom, which is much more easily prevented than cured.

9. With respect to disorders of the mouth and an immoderate salivation, I must beg leave to make an observation or two. The flow of saliva, if it is too great, will abate, when the peccant matter is drawn towards the other emunctories of the

the body, which may very well be done by diaphoretics, diuretics and loosening medicines, which have been mentioned in the foregoing numbers. In disorders of the gums, different remedies may be applied, and principally astringents, spirituous applications, vegetable and mineral acids. It should be observed here, that where the milder medicines are sufficient, the stronger should not be used. For this purpose, gargles made of alum, honey of roses, barley water, orange or lemon juice, sal. ammoniac. and water, spirits of wine and water, or dulcified spirits of salt and water, are very good ; astringent decoctions likewise, such as are made from tormentil roots, and snake weed, &c. &c. Rind of pomegranates, Peruvian bark, and bark of oak and alum ; besides this, if it is necessary, the gums may be rubbed by means of a pencil with spirits of wine, camphorated tincture of myrrh, aloes or gum lack. If the funguses grow out too much, they should be touched with oil of vitriol, pure or mixed with water. With respect to hæmorrhages

hæmorrhages of the gums, they may be stopped by the same remedies. The internal ones we have spoken of in No. 5. The others are easily stopped by a slight compression, and if this does not answer, by styptics, as in bleedings of the nose, which however I have never seen so violent, as to require the assistance of art.

21. I do not think it foreign to my subject, whilst I am describing this disorder, to make a few observations on the pernicious effects, which very severe cold produces in the human body, and so much the more, as it is observed on board of ship, that the extremities of aged, weakly and scorbutic seamen, are quite frozen or dead with cold, though the cold is not so severe as to produce the same effects in healthy and strong seamen, who, by moving about, are able to bear it. It appears moreover, that the circulation of the fluids is slower in them than in the latter, and that they are frozen sooner, especially if, as it often happens, they have not sufficient cloaths or covering. Besides, by being so weakly,

weakly, they are obliged to keep their hammocks, and on that account are more liable to this misfortune. And lastly, because the very pains themselves, and the gangrene occasioned by the sharpness of the cold, are sometimes taken for the effects of the Scurvy, or some other disorder.

So that the poor creatures, by this mistake, not only frequently lose their limbs, which might have been preserved, if they had been properly treated, but very often, by being thus managed, lose their lives. The men on board the *Pollux*, at Helvoet-fluys, experienced the effect of this in the winter of the years 1759, and 60, for many of them lost their limbs, and many likewise, so violent was the gangrene, could by no method of treatment be saved.

But if it happens that any part of the body is frost bitten, it is soon known by a great pricking pain, or an itching, which arises in the part, with a change from the natural colour; and by the external sensation being lost; so that the skin may be pinched or pricked with a needle, without

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any pain attending it. In the beginning the skin is pale, then a redness arises, which increases by degrees with a swelling and pain; if it is treated properly, the mortified part is sometimes recalled; if on the other hand it grows livid or black, a sphacelus, in a short time, seizes the part down to the bone, and then the mortified part falls away, or should be cut away, for else the person dies. If it is observed, that any part of the body is frozen so much, that the motion of the vessels and the fluidity of the humours are lost, and the part is dead, then the method practised in the northern climates should be followed, namely, to rub the affected parts with snow. Thus *Hildanus* on this subject says, *chap. 13. p. 792.* “The inhabitants of the northern climates, when they return home in the evening, rub their hands, nose, and ears with snow, before they go to the fire, or near their stoves.” He makes mention likewise of a traveller, who was frozen in a journey, and brought in for dead into an inn. The master of it im-

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mediately plunged him into cold water, upon which his body appeared covered every where with icicles; then giving him a large cup of mead with nutmeg and cloves, he put him to bed and made him sweat; the man recovered by these means, but lost the extreme joints of his hands and feet. Hence it appears, that if the congealed part is dipped into cold water time enough, or a wet napkin put upon it, it thaws by degrees, and the fluidity of the humours returns. As the physical cause, which renders them unable to pass, goes off, the fluids by little and little recover their usual state, and the cohæsion of the solid parts is at the same time preserved. For if the part which is frozen is too soon exposed to heat, the vessels are too much swelled by the blood which presses from behind, when in the mean time the congealed fluids are not able to bear the force of the circulation, by which means the vessels are broken, or so distended, that the blood bursts from them, and the part grows black and is dead.

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Care then should be taken not to dissolve the fluids by heat, nor to rub the parts too strongly before the fluidity of the humours is duly restored by the abovementioned treatment, lest a rupture of the vessels, and a greater extravasation of the fluids should be the consequence; for though the fluids are not frozen any longer, yet they are of such a nature as to cohere by the cold, nor can they flow through the vessels, unless they are restored by motion to their usual fluidity. From hence it is, that after a part is thawed, it is of service to rub it gently, and to give the vessels their due tone, by means of external and internal strengtheners; and if the part cannot be restored by those means, then to separate the mortified part from that which has life in it. The manner of performing this belongs to the province of surgery. The time for performing it is very well explained by *Quesnay*, in his *Treatise on the gangrene*.

*On the DIARRHÆA and DYSENTERY,  
arising from the COLD.*

22. IT has been already observed, that seamen in autumn, or when they come from a warm climate into a cold one, are very subject to a Diarrhæa, which often turns to a Dysentery, and so much the sooner, as the change of climate is more sudden. But these disorders, as they arise from a general cause, usually rage epidemically in ships, and from being epidemic, unless great care is taken, soon become contagious. But the first disorder differs from the second only in degree, and very often if it lasts some days terminates in the second. In general, likewise, the symptoms are nearly similar, unless that in the Diarrhæa the symptoms are in some degree milder, and in the other blood is voided by stool. Both disorders are attended with gripings, with frequent loose stools, a tenesmus, and almost a perpetual desire of going to stool.

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A Diarrhœa is in general attended with a slight fever, but a Dysentery is hardly ever free from one, and the stronger the fever is, the sooner the bloody flux comes on. If on the contrary, there is only a slight fever, then very often it is eight or ten days, and sometimes more before the fæces are coloured. In the beginning of this disorder, the sick generally complain of a shivering, a nausea, and a retching. They often throw up a greenish matter, but what is voided by stool is at first tinged with bile, then serous ; and by degrees, the symptoms increase with a confused, or perhaps no, sleep, and great thirst ; but if it continues some days, the stools grow red, and look like bloody water. These are accompanied with violent gripings and a hardness of the belly, they scarcely ever void pure blood, and they seldom lose their strength very soon, unless the symptoms of the fever and inflammation are very violent. At first the excrements have scarce any smell, but if the disorder continues any time, and a

gangrene ensues, the stench becomes then exceedingly offensive. But there are instances of Diarrhæas with little or no fever, and where the sick person enjoys a good appetite. If this disorder is neglected, it generally increases, and terminates in a Dysentery. These disorders generally prevail, when the weather is cold and rainy, and they usually make their first attack on those who breed a great deal of blood, and are but badly cloathed, and if the causes continue, others, however warmly cloathed, may be infected by contagion. *Vid. §. 31. No. 24;* but if they attack scorbutic people, they are generally fatal; particularly if they have the scurvy to a certain degree. But I have sometimes observed, that people of a bad habit of body, and inclined to the scurvy, are less liable to it, than strong hearty men, and that in them the disorder does not make so rapid an advance. I have already ascribed the causes of these disorder, to an excessive tightness of the skin, and to perspiration being suppressed. But to avoid

void repetition, I refer the reader to §. 23, and 42, where it appears, that the perspiration is not only stopped by the cold and damp air, but the vessels of the skin are also narrowed. The fluids, which are vitiated in quantity and quality, are by those means driven more to the internal parts, where they find less resistance. But the acrid matter which was before thrown off by the emunctories of the skin, being now driven towards the internal parts, particularly the intestines, is there secreted, by which means, not only the natural functions of these parts are weakened, but the humours contained in them are depraved by this mixture. But the consequences of this are much less dangerous in cold than warm weather. Moreover, from the too great afflux of such acrid humours, as well as of others which are derived from the whole body and center there, the intestines are irritated and inflamed, and, if the causes continue, are gangrened. With respect to the prognostic, the authors may be consulted who

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have written on the subject; as there is nothing peculiar in these disorders, unless that the sick continue pretty hearty, though there have been for one or two days symptoms of a gangrene.

23. But the cure of these disorders is not at all difficult, if we set about it in due time, that is, before the inflammation of the intestines has gained ground; and if the necessary remedies can be procured, it will be expedient to attend to the causes which have occasioned the disorder, that they may be removed, or at least as much as possible corrected. Thus, if any one has a Diarrhœa or Dysentery, it will be necessary, above all things, to put him into a hammock well covered with woollen blankets, and keep him in an equal degree of warmth all over. If the cold is very severe, it may be necessary to fill some small vessels or bottles with hot water, and put them to their sides, their legs, and feet to warm them, and before they grow quite cold, substitute others in their room. Above all things, care should  
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be taken, that the sick should not get up, and stand with their naked feet upon the cold or wet floor, or sit naked upon the close-stool; for in this disorder it is absolutely necessary, that they should continue in their hammocks, and if they are under a necessity of doing their occasions, that they should have a pan put under them. If the wind blows pretty fresh thro' the hatchways on that side of the ship where the sick are, sails should be put up between, §. 8. If this method is taken, the disorder may soon be cured, as will appear by the case undermentioned. But if the sick are not kept warm, all the other assistances of art will prove useless. Secondly, if the fever is pretty violent, particularly in plethoric people, venesection should never be omitted. Thirdly, if the putrid matter remains in the primæ viæ, it should be removed by one or two doses of ipecacuana, especially if there is any reason to think, that the disorder arose from contagion. If a vomit is not indicated, rhubarb with some grains of nitre is sufficient.

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Fourthly, the acrid humour which irritates the intestines, should be diluted by decoctions of barley, liquorice, grass roots, and marshmallows, &c. with chicken broths, and mutton suet, oil of sweet almonds, emulsions and gums. It may not be improper likewise in this case to make use of *Bolus Armena*, and *Terra Lemniæ*. If the cause of the disorder remains in the great intestines, emollient oily clysters, with or without a stimulus, are very serviceable. In the mean time the acrid matter should be drawn towards the skin by gentle diaphoretics, and antiphlogistic remedies, particularly camphire and nitre. *Theriac. Androm.* is likewise of service, with camphire or *Diascord. Fracast.* with some grains of ipecacuana, particularly if the pains are violent; and if these are not sufficient, recourse must be had to opiates. If there is no reason against it (§. 9.) fermentations or cataplasms should be applied to the abdomen. When the violence of the disorder is abated, and the acrid matter is lessened or expelled, the parts which  
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are hurt and relaxed should be strengthened, which is easily done by means of spoon victuals, and a little wine, and by giving now and then a spoonful of tent, or rough red wine. If this is not sufficient, a gentle decoction of *Cortex Simaroubæ* is found to be of very great service. Many other remedies may be met with in different writers on this subject for the cure of these disorders, but I think what has been said fully sufficient. But with respect to its being contagious, that may be prevented, if the causes are removed which occasioned it, of which I have already spoken very frequently. *Vid.* §. 30. and 31. I shall beg leave to mention a case, by which it will appear how much external heat contributes to the cure of these disorders. In the month of November, 1759, we sailed from Cadiz to Holland, in the *Princess Carolina*. When we first went to sea, the whole crew was very well; the weather was rainy and windy. After having been some weeks at sea, it began to grow very cold, and many

many of the men in *Decem' er* were taken with a Diarrhæa. I applied a number of different remedies, but all were in vain. The disorder terminated in a Dysentery, and gained ground every day; the number of the sick on board increased daily. At first they did not regard the disorder much, so that, though they had a Diarrhæa upon them for ten days, they walked about the ship, till they were obliged by having gripings to take to their hammocks. They universally complained of wanting sleep, which I could scarce procure them by the strongest narcotics, nay even by opium itself. In the mean time the cold weather increased, and the disorder grew worse; at length, some of them died after the most excruciating pains. Two or three days before they died, they showed symptoms of a gangrene having touched the intestines, for the pain abated, and the patients thought themselves better; but their hickuping, which was not very troublesome, the first and second day, shewed the contrary, and was succeeded by a cold sweat

sweat in the face and about the neck, a delirium, and then death. On opening their bodies, I found their small and great intestines gangrened, but the rest of the viscera sound. About the end of *December*, when we were not a great way from *Holland*, the cold increased, the number of our sick was above thirty, and till this time I could be of no service to any of them. Being fearful then, lest some of them who had no cloaths or hammocks should perish by the cold, I filled some bottles with hot water, and warmed some tiles, and applied them as abovementioned. I took care that they should have cloaths, and with such good effect, that those very men who had had no sleep for a whole week, after they were warmed slept composedly, and their pains and other bad symptoms considerably lessened. At length, on the 1st of *January*, 1760, we came to an anchor at *Helvoetfluys*; in a short time set sail again, and anchored near the *Isle of Wight*, or at *Spithead*, the cold weather still continued.

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14th of the same month, they all recovered, and that without any assistance from shore, so that, from the day on which I applied the bottles with warm water, no one died in the ship, but all returned in good health to their own country, in the month of *March*.

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### P A R T III.

*On the DISORDERS which generally occur  
in Harbour.*

WE propose treating in this third Part, of the disorders which generally occur in foreign ports; though indeed they are sometimes met with at sea, or at home, yet they seldom prevail so universally, unless the men have been kept a long time at sea, for if they have, it is the same thing, whether they put into a foreign harbour, or come to their own country. If there are any conspiring causes, they produce much more fatal disorders, than those which we have as yet

yet described, on which account, from the complicated nature of the causes, and the epidemic disorders of different countries, by which the men are affected when in harbour, I have thought it better to confine myself to those where they rage with the greatest violence. But though these disorders may seem to arise from one cause, yet they vary according to the seasons of the year, and are much more malignant at one time than at another. Hence I think it necessary to divide them into two heads; namely, those which are most prevalent in winter, and those which occur in summer. Under winter disorders, I comprehend those which begin at the conclusion of autumn, and are observable in winter and spring-time in harbours, where the weather is cold. Under those of summer, I rank such as prevail in harbours, where the weather is hot, or during the summer, or the beginning of autumn. And to these I shall add some observations, which I made in the island of Curacao.

C H A P.

## C H A P. I.

*On the DISORDERS which prevail in Har-  
bours, where the Climate is Cold.*

I. WE have already, in the first part of this Treatise, spoken of inflammatory fevers and catarrhs. In this, we propose treating of intermitting, quotidian, and continual remitting fevers. These are what generally prevail on board of ship at these seasons. But intermitting fevers, which are observed on board of ship, are quotidian, double and single tertians. Quartan fevers are seldom to be met with, and if they are sometimes, they are commonly produced by the primary ones, which have arisen from improper diet, and injudicious treatment. But as these fevers are, from their very name, obvious to every one, and have no peculiar circumstances attending them, I think it unnecessary to dwell on a description of them, and shall only mention some cautions with respect to them. The first observation I would make is,  
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that the Peruvian bark should not be given at the beginning of these disorders, before the sick have had three or four paroxysms, particularly in the spring. For I have seen them converted into continual fevers, by using the bark prematurely. But in autumn, if the primæ viæ are cleansed, it is given safely, and always indicated; nay, though the fever should cease, it should be taken daily, and perhaps continued twice or thrice in a week, till the sick have entirely recovered their strength. For by taking a few doses of this medicine, they are not only secured from a relapse of the fever, but also from the Scurvy, to which convalescents are particularly liable. But amongst continual fevers, the most simple one is that which is called a quotidian, and completes its course in four and twenty hours. This is very common on board of ship, but not at all dangerous, and generally arises from some evident fault in the use of the six non-naturals. The simple method prescribed by Celsus, is generally sufficient for the cure of it, viz.

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"The best remedies are, quiet and abstinence; and for drink, water; this for one day is sometimes sufficient. If the bad symptoms continue a second day, the sick must take a little food, but still drink water: on the next day, they may even drink some wine, &c. By this regimen, a threatening disorder is often prevented."

*Lib. 3. cap. 2. pag. 114.* But if the cause of the disorder is more violent, and of a worse nature, then it produces another effect: but before I take notice of that, I shall premise something with respect to the causes; for it appears, that sailors, when in harbour or in a road, are more healthy than at sea, because ships are kept cleaner, and some of the port holes, if not all, are constantly kept open, which is not the case at sea; and likewise, because they undergo no hardships, and can buy provisions for their refreshment. But as this subject has been largely spoken of already in the Preface, and in the second part of this Treatise, §. 29, 30, 31, to avoid repetition, I refer to that. But, lest I should

I should be charged with contradicting myself, I by no means think, that the men breathe an unwholesome air in all harbours, nor do I think that wine, and brandy and bread, fresh meat and fresh vegetables can produce disorders. If they do, it must be ascribed to an irregular life, and the immoderate use of them: for it sometimes happens, that the men, by having endured too great hardships at sea, and an inclemency of weather, have a tendency to disorders which lurk within them. If with this tendency they lead irregular lives at the same time, it will not be very surprizing, if many of them fall sick, though the air of the harbour be very wholesome. But on these occasions, the whole crew is seldom affected, unless the disorder is contagious, and then the air of the harbour has no concern with it, only the peculiar atmosphere of the ship causes all the mischief. Now though the nature and degree of the malignity, and the true mode of acting of the various heterogeneous particles which are suspended in the

air, and can be prejudicial to health, are very difficult to be known; yet we may judge of them in some measure from their effect, from their circumstances, and the observations of different authors. One human body in a state of putrefaction, easily communicates it to a perfectly healthy body, because that very body, which is already actuated with an intestine motion, may easily put another body into that same disorder, although it was in a state of quiet, provided it had a disposition to that motion before. *Stahlii Funda. Chymiae, Pars 2. tract. 1. sect. 1. cap. 5.* Cooks observe the putrifying quality of the air in meat, since it cannot be kept sweet a few hours below, unless well salted; while that same meat shall continue good some days, if kept upon deck. But there are many instances in authors of malignant, nay even pestilential disorders, arising from the air being tainted with putrifying exhalations. *Galen. lib. 1. epist. 1. de feb. differ. cap. 4. Forestus observ. lib. 4, observ. 11. and 26. Hoffman has*

has observed, that the vapours which rise out of marshes and lakes, have produced putrid disorders. *Med. Rat. Syst. Tom. 1.* pag. 291, and *Tom. 2. pag. 86.* But the vapours which rise in narrow harbours, may be considered as marshy, as well as those which come from the well of the ship, particularly if the water has been there any time, for the fœtid smell shews, that the sea water, though salt, cannot preserve the particles contained in it from putrefaction. The sailors experienced the bad effect of it in Rochelle harbour, when they opened a cask full of sea water. *Vid. les memoires de l'Academie Royale des Sciences, 1745.* Besides, the exhalations of the sick on board taint the air surprizingly, and render it like that in hospitals and prisons, where a great number are confined in a small space, as *Pringle* has very well observed, in his treatise *de Morbis Caſtrenſibus, &c.* Consult *Huxham* likewise on the air, and on epidemical disorders. The men who breathe such an air, may be affected by it in different ways, according to the greater

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or less quantity of the putrefaction, and the power and disposition of the subjects to receive it. But the violence of putrefaction, particularly in cold climates, seems principally to shew its effects in the primæ viæ, by tainting the matter contained in them, which is known by a pain in the stomach, stinking belches, bitterness in the mouth, and offensive stools, which for the most part are the first symptoms of epidemic or contagious disorders. And these putrid particles, as well as the air in which they float, are carried with the food and saliva into the stomach and intestines, where they mix with the aliments, and dispose them to putrefaction. From thence they are taken up by the absorbent vessels of the intestines, and mixed with the juices, in which they produce different effects, according to the malignity of the putrid particles, and the disposition of the subject who receives them, as well as other accidents which promote or retard their effect. Hence different kinds of disorders take their rise, amongst which the least, is the depravation of the matters

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contained in the primæ viæ, which create a disagreeable sensation in the parts to which they adhere, on account of their heterogeneous nature, averse to the human constitution, and thus producing spasms and fevers; which is so much confirmed by experience, that not a doubt remains about it, for the dreadful symptoms which are produced by it, are observed to abate after the evacuation of the peccant matter. But if the poisonous matter is already mixed by the lacteal vessels with the blood, and does not, by the small power it has, shew its effect in the fluids, but only affects the solid parts by irritating the nervous system, it increases the motion of the arteries, but not in such a manner as to counteract entirely the excretory organs; or is so disposed, as to be thrown off by degrees, and without any sensible evacuation by the emunctories of the skin. Then another quoditian fever arises of a worse nature, which does not abate, though the primæ viæ be cleansed, and is called by the antients, *Synochus non putris.* But if the morbid matter is of

such a nature, as to be improper for the emunctories of the body, and as in the preceding case, cannot be excreted by a slow evacuation, and that the powers of nature, and the action of the vessels, are absolutely required to prepare and fit it for excretion, that it may be expelled by a critical and salutary evacuation. Then a fever of a worse kind arises, which at this time is very frequent, and on account of the white or greenish pellicle, with which the placenta of the blood is covered, was called by the antients, *Synochus putris*. But this pellicle is not the consequence of putrefaction, but is rather to be esteemed a salutary operation of nature, and absolutely requisite in the cure of these fevers, as *Quesnay* has very judiciously observed, in different parts of his treatise on fevers. Nor should this fever, though it arises from a putrid cause, be treated as a putrid one, but should be cured by the very mechanism of the fever itself, which, if it is any way hindered, renders the disorder dangerous, and very frequently kills the patient.

patient. But if the morbid matter is so powerful, or is received into a subject by whose disposition it shews its effects in the solid as well as fluid parts, so that the red part of the blood changes into a putrid colliquation, then it produces very different and putrid disorders, such as malignant, colliqueative putrid fevers, nay even, according to some authors, the plague itself, which indeed I have never seen myself; nor do I believe, that the plague is so similar to the diseases of seamen, as modern authors say, nor does it seem, that they can be ranked under this name, though they are infectious amongst them, and amongst those who breathe the same air. Abscesses, petechiae, and livid spots, which are sometimes, but very seldom, observed upon them, are not such evident symptoms of the plague, but seem rather in this case to depend on the constitution of the patient, than on the nature of the disorder. But the name of malignant, which they generally bear, does not explain the matter better, and seems to belong rather

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more to other disorders than these; besides, that it is too general, and is with more propriety given to such distempers as are fatal, and whose causes are unknown. This denomination may also be the cause of some fatal mistakes in the inquiry and treatment of these complaints. On which account, I think it better to keep to the name which the antients gave it, as they have best described the disorders which are here treated of: for the number and complicated nature of the symptoms which are to be observed, in some of those who have these disorders, cannot be referred to the malady itself without confusion, as will appear hereafter in the description of them, to which opinion the successful and easy cure of many patients has led me. But Pringle and Huxham, both of them very able men, have lately attempted, in different parts of their writings, to establish so great an affinity between jail and hospital fevers, and the plague, that they have scarcely left any intermedium. Perhaps in the places where these very learned

learned men have exercised their profession, the morbid causes have been more violent, or the subjects have had a greater tendency to receive them, so that they have found the disorders of a worse nature than I ever found them; but I have observed similar symptoms in French hospitals, and out of them likewise, amongst the soldiers and inhabitants who lived in healthy spots, and on board men of war, where this fever prevails more than any other, particularly in cold climates. Nay, I remember that I prescribed for a hearty young man of two and twenty, who was troubled with a tertian intermitting fever, Peruvian bark in large doses, after the primæ viæ were cleansed, and that such a disorder or putrid synochus followed, though nobody in the neighbourhood had any such disorder, nor did his mother, his sisters, or the maid servants, catch it from him. I have found something of the same nature on board of ship, from the use of Peruvian bark in vernal intermitting fevers, but whether that is to be attributed

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to some latent infection, or to the remedy, or whether it comes of its own accord, I cannot pretend to assert; however that may be, I shall give an account of the disorders as I found them.

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*On the Humoral or Depuratory Fever, called  
by the Antients Synochus nonputris.*

IT is very common on board of ship, particularly in the spring, to meet with the fever, which is described by the antients under the name of the *Synochus non putris*, at least whose symptoms are very similar to that. On which account I am unwilling to depart from this common name, although they may differ in some respects; nor is the name of any consequence, if the subject be rightly understood. But under this, I comprehend the continual mild remitting fever, in which the body, by a gentle and continued evacuation, is freed from the morbid matter, without any corrupted concoction, or manifest crisis, and which is cured at the end

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of the third, fifth, seventh, ninth, or eleventh day. This fever sometimes partakes of the tertian, but generally heightens every day towards the evening, and sometimes proceeds so equally, that the time of its heightening and diminishing cannot be distinguished. It is called by some the bloody fever. It principally attacks young men of a plethoric habit of body ; it often takes its rise from evident abuses in the six non-naturals, but generally from viscid matter lodging in the primæ viæ, or from perspiration being stopped. This fever seems to partake of the nature of the putrid *Synochus*, which rages principally in winter and spring, and of the bilious fever in summer ; for, according to the change of the seasons, it verges towards one or other of these disorders, and sometimes changes into them. Pringle observed this circumstance, and says, that he found symptoms of putrefaction and inflammation in autumnal fevers, as the weather grew cold, but it is milder than either of them. The reason may

may be drawn from the subject being more healthy, or from the very nature of the cause; for the morbid matter is of less efficacy and power, or of such a kind, that it can easily be removed by the force of nature, and the action of the vessels, or by the febrile mechanism itself: or else is nearly fitted to the operations of the excretory organs of the body, or may be easily adapted to them, either because it generally happens in spring-time, when the fluids are less inclined to putrefaction than in summer, and on account of the approaching heat of summer, finds the body otherwise disposed, and the excretory organs more apt to receive the morbid matter than in winter; the morbid matter is in all probability likewise for the same reason of a more fluid nature, so that it can be thrown out of the body by degrees, and without any great efforts; by which means, in the first beginning of this disorder, signs of concoction appear in the urine, a circumstance which has not escaped the notice of the old physicians,

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by which they gathered the indications of cure, though they did not consider it as a perfect concoction, as appears from their writings. "For the urine which has a red-dish hypostasis, is not of an exact concoction." Duret. in coacis de urinis 3. pag. 465. 10. "The urine which on the fourth day has a red cloud, is very nearly fitted for a crisis, because the concoction of a very kind and almost digested matter, which is already begun, is then sufficient for a perfect crisis." Hipp. apud Duret. 4. pag. 496. 8. and 10. "An intense red urine, of a thick substance, in which a small cloud appears on the first day, shews a Synochus without putrefaction." Galen apud savon. 679. "A red and turbid urine, on the second day, foretels a crisis on the fourth." Savon. de urinis, pag. 681." If there are no dangerous symptoms, but rather favourable ones on the first day, though the fever is pretty high, if the urine is of a good colour, and moderately thick, there certainly will be a crisis within the four first days, and the more, if there is a cloud in it.

Galen

*Galen de crishis, lib. 1.* "But the urine which is reddish, and has a red and light hypostasis, if it is so before the seventh day, continues all the week; but if it comes later, the fever will last longer, or even a long while." *Duret*, in *coac.* in the above quoted passage. This fever is classed by *Galen* under the quotidian, as appears, 9 method. cap. 2. and 4. It has also symptoms similar with quotidian, as *Primerose* has judiciously remarked, "but somewhat more observable, the heat is gentle, and by no means severe or sharp; from the mildness of the disorder the pulse is equal, full, frequent, and swift; the urine is in the natural state, excepting that it is a little red, and thicker than ordinary." Little clouds are often observed in this fever, not only on the surface of the urine, but even in the middle of it, which seldom happens before the fourth day, but it very seldom lets fall a sediment. "It begins without a chill, shivering, or cold," *de febribus, lib. 1.* Besides the abovementioned symptoms, those who have this fever complain

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at the beginning of a spontaneous laffitude, a heaviness in the head, of a numbness and pain in the back, loins, and joints, and of a distension of them; after which a heat and thirst succeed: besides the face grows red, the eyes are slightly swelled and inflamed, the skin is soft and moist, and the heat is equally distributed to the whole body. The thirst is not very violent, the head is heavy but not in great pain, nor is the patient greatly weakened. These are the common symptoms of this fever, however, it is attended sometimes with more severe ones; namely, with a low and hard pulse, anxiety, and a delirium, which proceed from the abovementioned causes; namely, a bad chilification in the primæ viæ, and too great a fullness, but these remit after an evacuation. But a slight delirium, which is sometimes observed when the fever is at the height, or at any exacerbation, generally depends on the tenderness, or too great sensibility of the patient, and does not render the disorder more formidable; for it is but of

short continuance, and is soon over. I have often met with this disorder on board of ship, attended with the symptoms above described. The quicker or slower event of it, may be gathered from the cause and greatness of the functions which are hurt, and from the abovementioned symptoms. “*For the greatness of every disease, is in proportion as it differs from the natural state.*” *Galen method. med. ad Glaucon. cap. I. pag. 345.* After the putrid *Synochus* had raged contagiously among the sailors in the month of March and the beginning of April, I saw this fever take its place at the end of April, when the weather grew a little warmer, as may be seen hereafter, in the description of the putrid *Synochus*, which happily for the sick was then changed into this mild fever.

3. The cure of this fever is not difficult, and is often completed by nature alone: but the indications of cure are gathered from the causes and the symptoms; and as the air is frequently in fault  
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in this case, the person who has the care of the sick, should above all things attend to this circumstance, particularly if there are a great number of sick on board at the same time, to take care that pure air may be occasionally let in where they lie. But if it cannot be often renewed, particularly if they lie on the lower deck, there is in some ships a space for this purpose, called the *koebrug*, in which the letting in air is more difficult than between decks, and from whence it is more unwholesome. Besides this, the sick ought to live upon thin diet, such as we prescribed in the first part of this Treatise, and should be pursued in the beginning and height of this disorder. This circumstance may afterwards be regulated according to the violence of the symptoms, or the strength of the sick; for in the decline of this, as in many other disorders, a man may err by being too severe in regard to diet, as well as by indulging too much. It should seem, therefore, that it were better to support the strength of the sick by nou-

rishing food, than to be too severe in those matters. I have very frequently given nourishment of that kind, provided it was easy of digestion and eaten in moderation, and never observed any bad consequences attending it. A thin watery opening, and subacid drink is requisite in these cases, with the addition of some nitre; if the heat is great, such drink is made of barley, stick liquorice, grass roots, &c. &c. I have often prescribed pure water with a little lemon juice fresh squeezed into it, and have found it answer. If any corrupted matter is lodged in the primæ viæ, it should be evacuated by a scruple of ipecacuana, mixed with one or two grains of tartar emetic, or a gentle loosening medicine of senna leaves, cream of tartar, or salts and manna. It should be observed, that if the vessels are too full, and the heat or fever too violent, it will be better before the vomit, to open a vein in the arm. When the primæ viæ are cleansed, if the symptoms of the fever are violent, I generally order a vein to be opened

opened once or twice more. In the mean time I have prescribed with good success the following julep. Take two pints of decoction of subacid apples, if they can be procured, or of the ptisane abovementioned, or of pure water: two drachms of pure nitre, spirit of sulphur per campanam gutt. *L*, four ounces of simple oxy-mel, *M*. They took a tea-cup full of this every hour; or take two pints of the above decoction, four ounces of currant jelly, or of syrup of lemon juice, two drachms of sal polychrest, and of dulcified spirit of nitre, gutt. 60. *M*, as above. If a stool is necessary, it may be promoted by an ounce or two of manna, or clysters. If the patient could not sleep, I added an ounce of syrup of diacodium, or poppy, to two ounces of the julep; and let him drink it in the evening, or procured him rest with a paregoric emulsion. If the urine was cloudy, I now and then prescribed a scruple of sal polychrest in a proper liquor, or the following potion. Take a drachm of powder of rhubarb,

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two ounces of syrup of the five aperient roots, two drachms of sal polychrest, six ounces of decoction of apples, twenty drops of dulcified spirit of nitre, *M*, an ounce to be taken every two hours. And at length, when the fever had remitted, if the symptoms indicated any impurities to be carried off, I took care to evacuate them by a laxative medicine. Thus have I seen many very happily cured of this fever, by this simple process, and that too, without any great wasting of their strength.

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*On the Critical Fever, called the Synochus Putris.*

4. **T**HIS fever is owing to causes much greater than those which produce the simple *Synochus*, which have no connection with the excretory organs, and act mostly upon the solid parts of the body, but very little upon the fluids : it generally terminates in a purulent concoction, and a critical evacuation ; on which account,

count, and because of the yellowish and sometimes greenish humour, which often covers the surface of the placenta of the blood, after its being drawn from a vein, and had been observed by the antients, it was called putrid ; it being, they thought, owing to a putrefaction of the blood. But *Quesnay* has attempted to contradict this opinion of the antients, *dans son Traité des fièvres & de la suppuration*. The experiments and inspections which *Antonius de Haan* has published upon the blood in his *rat. meden. in nosocomio practic. Vinaobonensi*, may likewise be consulted. The very learned Dr. *Pringle* seems to be of a contrary opinion ; he thinks with *Hippocrates*, that the formation of this humour, and of pus, is the effect of putrefaction ; he supports his opinion by many weighty arguments, which may be seen in his writings, which well deserve to be read. But I, for my part, chuse rather to confess my inability to decide on this matter, than offer any undigested arguments pro or con, particularly, as the

3:2 *On the CRITICAL, &c.*

nature of my design does not allow me sufficient time to examine it thoroughly. But whether the blood can undergo any change without putrefaction or not; whether that humour which covers the surface of the blood is produced by the action of the arteries, or the mechanism of the fever, and the heat arising from thence; or from the natural heats according to the antients, or from a mixture of some deleterious matter with our fluids, or from putrefaction, I leave to abler judges for their determination. But if we attend to the daily observations on the effects of putrefaction, we may still in some degree retain a doubt on this subject. For if we take the word *putrefaction*, according to the sentiment of the very learned *Pringle*, and derive all the productions of nature from thence, then most certainly the production of this humour, and of the pus, cannot be excluded. Nevertheless, in strong healthy men, accustomed to hard labour and well fed, who every year thro' custom have blood taken from them, such a crust

a crust is found on the surface of it, tho' at that time they have no particular disorder. I have moreover, very frequently found an inflammatory buff on the surface of the blood, as well as a formation of pus, where putrefaction was not the cause, or very little so, and where the action of the vessels was always very strong, which circumstance does not happen in putrid disorders, as in inflammatory fevers, and such which happen in consequence of large wounds; and indeed they are scarcely, if ever, found in disorders which manifestly shew the effects of putrefaction. I am not ignorant, that it may be objected, that inflammatory disorders arise principally from perspiration being stopped, and that this occasions such a degree of putrefaction in the humours. But in putrid disorders the fluid is thin, gelatinous, oily, easily dissolved, adheres very little to the placenta, and so mixed with it, that it hinders the concretion of the blood, and is very different in colour and consistency from that which I am now speaking of:

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of all, that concocted matter or pus, which is so much sought after, and which is more putrified than that humour, and always prognosticates a happy event when it shews itself, is not found in putrid disorders, but instead of it, we meet with a thin, corrupted, sanious, corrosive fluid, such as is found in the last stages of the Scurvy and in cancers, which cannot be called a concocted pus.. This was not unknown to the antients, who, though they thought differently on this subject, yet do not allow so great a putrefaction.

*“They speak improperly, who define that part of the blood which has been putrefied by the fever, secreted and driven down with the urine to be an hypostasis: if it is an hypostasis, it not only partakes of the putrefaction, but is truly a pus, and yet corrupted matter differs from an hypostasis by putrefaction alone.” Ballon. de hypost. urin. Hippocrates compares urine with ulcers: “ If ulcers yield a white matter, they denote a speedy cure, but if they change into sanious humours, they are malignant; in*

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the same manner as urine does :" lib. 1.  
*de indicat.* The putrefaction of the fluids  
which happens in the vessels, is like that  
which happens in inflammations and ab-  
scesses, but sometimes nature gets the bet-  
ter, and sometimes it is overcome ; when  
nature gets the better, the pus is formed.  
In the abscesses, and in the humours of the  
veins, there is a something which subfid-  
ing in the urine answers to the pus, and  
that putrefaction has something of con-  
coction in it ; thus, that putrefaction  
which we have called concoction, always  
terminates in one species of matter, and  
has the marks of it. *Galen, cap. 6. lib. 1.*  
*de feb. differ.* Moreover, " that which  
is matter out of the vessels, in an hypo-  
stasis in them : the fever is like a general  
abscess of the veins, only differing in  
place" *Ballon. de hypost. urin.* But the  
cause, besides the nature of the pus, is the  
matter itself, or the heat ; but it seems to  
be both, for there is a putrefaction of the  
fluid in some degree, and a foreign heat,  
but does not exceed ; for if it was to ex-  
ceed,

ceed, or there was a great putrefaction of the fluids, there would be no laudable pus, nor would it have the proper marks of it: from whence *Galen* concludes, that the blood which is well changed into matter did not putrefy at first, but rather was concocted, or if there was any putrefaction, that it was very inconsiderable. See the passage abovementioned. Nor is it a new observation, that the formation of laudable pus is a work of nature in its vigour, and never succeeds so well when the strength is impaired. It had already been taken notice of by the antients, as appears in many places. *When matter is formed, the fever is greater and more severe, because there is concoction, and there is a contest between the natural heat, and that which is against nature, in a humour which is already foreign to nature.* *Ballon de hypost. urin.* For, according to the physicians, no man dies, when symptoms of concoction appear, which is to be understood no man dies by the violence of the disorder; for if any mistake is made, death may be the consequence.

quence. *Ballon de hypoft. urin.* “The efficient cause of a concoction is the vital principle of the solid parts, and the vivifying power which proceeds from the heart.” *Duret. in coac. bipp. 10. pag. 224.* Moreover, “the concoction of the fluids arises from the solid sound parts of the body, and is the work of nature.” *Galen Comm. 2, in lib. 1. Epid. apud Lacunam.* Besides, every one knows, that in putrid disorders, the powers of life, as well as the action of the solid parts, are so broken, that they are unequal to the contest, as the antients term it. I have often, in the beginning of this disorder, observed colliquative symptoms, which, as long as they have continued, have prevented concoction, and as soon as they have disappeared, the pulse has arisen, the strength has returned, and concoction taken place. And though our juices tend very much to putrefaction, yet when extravasated, they are not remarkably putrid, though they stagnate in the body many days. For I have often seen surprizing translations, frequently

quently from one part of the body to another, to the great relief of the patient, which could not have happened, unless the extravasated particles had been absorbed, and mixed with the fluids, translated to some other place, or evacuated by stool, urine, or the nose, of which numberless instances have been observed. I am surprised, if there be so great a corruption in them, as often appears from the time which they lodge in the part, that by their mixing with them, they do not change the whole mass of fluids into a putrid colliquation, and yet the contrary is seen every day. Consult on this subject *Guy de Chaul. traité des tumeurs, Denis Pomaris dans les observations de Riviere, Obs. 1. Thieri de Heri. pag. 108 and 209. Ephem. Dec. 3. Ann. 2. Dec. 3. Ann. 5. and 6. Lamotte Observ. 50 and 60. Zaccutus Lusit. lib. 2. Observ. 172. Maschetis Obs. Med. Chir. 46. Pare, lib. 17. chap. 51. Hottinger Ephem. Dec. 3 Ann. 9 and 10. Moinichem apud Bonetum Biblioth. Chir. Cent. 1. Obser. 77, and many*

many others. Besides, in this fever, the placenta is strongly concreted with the cuticle, and the humour which forms this skin is so firm, that it cannot be easily broken through. This is very different in putrid disorders, where the placenta, or red part of the blood is scarcely concreted, and sometimes not at all. This is the same also with the humour on its surface, when there is any. From these premises it follows, that though putrefaction and concoction should be the same thing, and performed in the same manner, yet at least we may admit of a distinction between fevers, which are terminated by a purulent concoction, and a critical evacuation, and those which terminate without them, and are of a worse nature, and really putrid, which will be spoken of hereafter ; though both seem to arise from the same cause, as I have taken notice of above, §. i. whose violence is diminished by the cold, and rendered less active, so that it acts with less force upon the body, than in the heat of summer. For these fevers differ among them-

themselves ; they bear various appearances, and require different methods of treatment, on which account this distinction ought to be made, that though they do not differ entirely, yet that they do in some degree. The manner in which this fever makes its progress, and the symptoms which attend it, will appear from an account of the following voyage, during which it raged very violently, and in a few days, like the plague, seized the whole crew, so that only four of them escaped the disorder.

In the year 1757, at the beginning of the summer, the *Stadt Delft*, a fifty gun ship, with upwards of three hundred good seamen, set sail for the coast of Spain and Italy, and cruized in the Mediterranean the whole summer and autumn. During this time she put into many different places; at last, in December, sailed through the straits of *Gibraltar*, and came to an anchor at *Cadiz*. The summer and the beginning of autumn were pleasant, but the latter end of it was damp, rainy, windy and

and cold. Through the want of cloaths and covering many of the seamen had the Scurvy, but by proper care, and eating fresh vegetables, such as water-cresses, garden radishes, apples, lemons, and oranges, &c. &c. which our captain and myself gave them, they were most of them restored to their former health. At length, in January following, she left Cadiz, entered the Mediterranean again, directing her course for Naples, where, after having cruised a little, she came in the beginning of March. The weather in this passage was very rainy, windy and stormy. The ship, from the waves breaking very frequently upon her, had taken in a good deal of water through the apertures of the decks and the hatchways, so that the decks were almost always wet : by which means the sailors were obliged to get into their hammocks very frequently with wet cloaths. Besides this, it was impossible to keep the port-holes open but very seldom ; however, they kept the ship tolerably clean, and the pumps at work. But

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the whole crew still continued healthy; except being troubled with the Scurvy; for when the ship came into harbour at Naples, she had only twelve sick on board, who could not do their work, eight of whom had the Scurvy, two were confined to their hammocks by wounds, and two had the putrid Synochus. The two last were excellent sailors, and very hearty men, who before that fever had been very well during the whole voyage. In the stay which we thought to make here, our Captain, Mr. *Pickett*, was very desirous of refreshing his crew after their fatigues in the voyage. In order to this, he gave them, instead of bacon, a dish, which is called *poespas*, and is made with fresh beef, and different kinds of vegetables, rice or barley. This they devoured with the greatest eagerness; in the mean time, the purser gave them some money to buy refreshments, which they did not fail to do, by purchasing wine, and other provisions to regale themselves with. They danced and sung, and were very merry. The business  
they

they had to do was not very fatiguing, and our captain very prudently took care, that the ship should be kept sweet and clean, the port-holes were kept open, and the air sails, when the weather permitted, hung up. A few days after our arrival, seven of those who had the Scurvy said they were very well, and gave themselves up to diversions with their comrades. But this merry life did not last long, for we had scarcely been here eighteen days, when eighty of them were taken with a fever, which kept increasing so much, that in the space of six or seven weeks, the whole crew was ill of it; nor did they who were enlisted in this harbour escape it, the officers and men were equally attacked, and those who frequently visited the sick, as well as those who avoided them, were seized in the same manner. The men, who were but just enlisted, were scarcely three or four days on board before they were taken ill. At the beginning of our stay here, the weather was cloudy, windy and cold;

from whence it happened, that we had sometimes stinking fogs and rains, though not very frequent. At the end of March, and the beginning of April, the weather began to be fine, which contributed not a little to the recovery of the sick. Their number in this harbour, including the new enlisted men, exceeded three hundred, seventeen of them died, one (whose case I have already mentioned, §. 15, No. 9. in the preceding chapter) died of the Scurvy ; and another by an accident from the anchor ; the others died of this fever. It should be observed, that all the sick continued on board, for they were forbidden to come into the metropolis, from the fear of the disorder being contagious. Now any one who is acquainted with the manner in which the men are taken care of on such occasions on board of ship, will not find it very surprizing that many of them should die. I have indeed already, in the first and second part of this Treatise, taken notice of several circumstances, which prevent the happy termination

nation of disorders on board of ship, which being well weighed, will shew the reasons of our practice proving unsuccessful. Before the number of the sick exceeded twenty or thirty, I took care, that every thing about them should be kept clean, and that all the sick should be put in their hammocks, and if they happened to have none, I begged them of their comrades for them. I got two without the bedding of the captain, which at first were of the highest use, for they who had fouled their hammocks, were put into these whilst their own were cleaning. But when the number of the sick increased so fast, and exceeded an hundred, every one wanted his own hammock, nor were those which I borrowed sufficient for the purpose. By the numbers increasing so fast, many who had the fever, and had no hammock, were obliged to lie upon a chest, or upon the naked floor. If they were delirious, I ordered them to be bound hand and foot; I ordered those who had hammocks to be lowed up in them, lest they should jump

out of them, or throw themselves into the sea. So that many of the sick were obliged to lie with their cloaths in their own filth, from the first day of their illness to the end of it, which contributed to infect the others. I ordered aromatic and juniper fumigations; and vinegar to be sprinkled where they lay, but it appeared to have very little effect. But it is worth observing, that the *Edam* man of war from *Amsterdam*, of the same rate with us, and with which we sailed in company, was very sickly through the whole voyage, and buried many of her men, recovered here, though she lay not a mile distant from us; we lay in harbour, but the *Edam* was at anchor in the road. Excepting the place, I recollect no difference at all between them, neither in eating or drinking, excepting that *poeftas*, which our people ate as much of as they chose twice in a week; nor was there any difference in men, excepting that ours were strong and hearty, but the *Amsterdammers* were weakly and sickly through the whole voyage,

voyage, and that our men had a better stomach than the others. Having premised these circumstances, I proceed to the history of this disease; but as this contagious disorder, through the variety of the objects, produced very different effects, I shall describe them particularly in the three following numbers. And first, how it attacked the young hearty men, who had before this fever enjoyed a good state of health, and what symptoms I observed in them in the course of the disorder. Secondly, how it affected those who had been troubled with the Scurvy in the winter, and were not quite restored; and lastly, how it shewed itself in those who had a confirmed Scurvy. The first who were attacked by this fever, as I said before, were men who were very healthy before that time. Six or seven strong hearty men were in a short time seized with the same disorder: that continued for some days without any considerable increase in the number of the sick: at last this fever attacked all indiscriminately, healthy and

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unhealthy, so that every day there was an increase of five or six, nay sometimes ten, newly infected, who were seized with these symptoms.

1. The healthy and hearty middle-aged men, or youths, who before this fever had enjoyed a perfect state of health, complained at the beginning of the disorder, of a heaviness in their limbs, a dead pain, particularly in their joints, a pain in the head, back and loins, and of frequent changes from heat to cold. They continued in this state for some hours, and sometimes for a whole day, before worse symptoms appeared : they then felt a shivering and cold, to which a burning heat succeeded, and an unextinguishable thirst. Their pulse was hard and quick, and generally increased in a short time, particularly in the young people. But if the pulse continued depressed any time, it generally rose, and grew fuller and stronger after opening a vein : the skin from first to last was dry and rough, but when I touched the wrist of the patient a little stronger than

than usual, besides the burning and a prick-  
ing heat, the arm felt as if it was some-  
what swollen. Some at first threw up a  
yellow and greenish bile, others attempted  
to vomit, but could not. Some complain-  
ed of a very great pain in the pit of the sto-  
mach, and almost all of a stench and bit-  
ter taste in the mouth. Their tongue was  
yellow and greenish, they lost their appe-  
tite entirely, their face appeared a little swel-  
led and red, they opened their eyes, which  
sparkled greatly, as much as they could,  
they were quite fixed, and moistened by  
involuntary tears. And lastly, their strength  
seemed totally gone. As the disorder in-  
creased, the symptoms were more violent.  
They then almost all complained of an  
oppressive pain in the head, which seized  
the front and back part of it, and they de-  
scribed it, as if the forehead and the back  
part of the head were pressed together; *it feels*, they said, *as if my head were in a vice*. Opening a vein once or twice was  
frequently found to give relief to this pain.  
In many of the men, besides the excessive  
thirst,

thirst, their tongue was parched, cracked, and black, and that chiefly about the height of the disorder, when it was with great difficulty they could put it out, although they tried to do it; they generally pointed the tip of it upwards towards the palate, or the fore teeth, with a tremulous motion; if they put it out of their mouth, it presently was drawn in again by a contrary and involuntary motion. The fore teeth, and sometimes the lips, were covered with a black crust, the voice was shrill and hollow, and many lost it entirely; their swallowing thro' the quantity of the apthæ which lay in the throat, became so difficult, that the liquor which they attempted to get down came out again through the nostrils. This was a bad symptom, especially in the increase or height of the disorder, and was mostly seen in men of a robust constitution. In the mean time, the fever continued to heighten and remit every day, and carried symptoms with it of a double tertian, so that the exacerbations of the first day of

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the disorder answered to those which appeared on the third day, and were stronger than those which happened on the second and fourth day. The restlessness and tossing about increased likewise on those days, though the pulse sometimes continued the same, so that the sick were much more restless on one day than on the other. At last the exacerbations anticipated the accustomed hour of their coming on. But the pulse and the breath, through the whole course of the disorder, were sufficiently strong, unless any mistake was made, or any symptoms of a colliquation of the fluids appeared, which seldom happens in this class of men. From the commencement of the disorder to the height of it, the sick could very seldom get any sleep, a delirium succeeded this, and then they fell into a sleep, from which it was almost impossible to awake them. In some of them, particularly the young men, the first days of the disorder, it was attended with twitchings of the tendons, which went off again about the height; in others

others it was observable about the heighth. In some only at the decrease I observed convulsive motions. In the last stage, I found their teeth chatter very much, but this was no bad symptom, if other bad ones had not preceded, and the swallowing continued free. The urine at the beginning was of a red or orange colour, without any hypostasis. If the vital powers were pretty strong, about the eighth or tenth day, or after the fourth, but generally after the fifth exacerbation answering to the first, little clouds appeared in the urine; if nothing intervened on the part of the physician, or his patient, which broke in upon the power of the succeeding exacerbation answering to the first, a cloud in the urine at the end of the same, or on the eleventh or the beginning of the twelfth day always appeared, and in the same way of the last exacerbation, if it proceeded well, a crisis succeeded it, and the urine deposited a white reddish sediment, or only white. The sick then were entirely absent, but on the fourteenth,

fourteenth, and oftener on the fifteenth day, waking from the lethargy, tho' still a little delirious, they generally came to themselves : those whose urine in the beginning or about the height was limpid or turbid, like that of horses, were very delirious ; if that happened at the height, or in the decrease, they grew furious, then lethargic ; nor could they be roused by any stimulating medicines, some had an abscess about the head. I saw some of these, who being deprived of all external sense and voluntary motion, lay for six, seven, nay even nine days, like apoplectic people ; one of these was happily restored ; the 18th day he had a great quantity of white matter of a middling thickness come from his nostrils. Others had some matter come from their ears, of whom only one was recovered after a long time, two of them died, one a short time after the eruption of the pus, the other lived about ten days after it. This man, when they put some broth or liquor into his mouth, swallowed it, opened his eyes now and then,

but

but shut them soon again: in the mean time he was convulsed, totally void of sense, breathed with difficulty, snorted, and then died. In the urine of these men, some days before the eruption of the matter, I found a pretty large quantity of white sediment like chalk. I observed moreover, that the urine of those, whose crisis shewed itself by the lungs, deposited the same sediment in equal quantities. On the decrease of the disorder, and even before that, the sick were generally lethargic, after a delirium; when that had been very violent, they fell into a sound sleep, but they who were but slightly delirious, were only sleepy, and could easily be awakened. These men, besides the pain in the fore part and back of the head, and sometimes on the top of it, complained of a numbness in their hands and feet, as if they had been dead. It should be observed here, that in the beginning of this disorder almost all of them complained of a heat, and slight numbness in their fingers and toes; which increased

increased in this last stage ; some at the end of this period, besides the numbness, felt a creeping motion, like ants, in their hands and feet, some felt the same sensation about the abdomen and breast, with a coldness at the same time. Some in the last stage, and before, were hard of hearing, but most of them at the decrease of the disorder. Many had their sight impaired, and even entirely lost it, but some days after the crisis it returned again. Some saw objects, but believed that they were covered with a cloth, or in the shade. Yet many of them knew their friends by their voice. All of them said, that after the crisis, they saw as through a mist of flies. This symptom continued with many of them after their recovery, one or two months before it went away entirely. At the decrease of the fever, the skin was softer and moister, and the heat abated ; when matters went well, the pulse in the exacerbations was not so quick, but large and strong, which was always a good sign ; the breathing was

was strong and like sighing. On the critical days, I observed the pulse was very various ; the large, soft, and languid pulse was the best ; the intermitting as well as small, languid, though equal pulse (provided the preceding symptoms were not bad) was by no means to be dreaded, otherwise it was rather dangerous. Where the tongue was dry, parched and black, it began to moisten in this stage, and the black crust separated on the sides and end of the tongue, and at length by a more plentiful secretion of the saliva, separated by degrees, and went off entirely. When this was the case, the sick swallowed more easily. His body was gently open, which before was bound ; some had a slight diarrhoea, with an abatement of the symptoms, but this went off of its own accord, after a few days. There were some of this class, who, at the beginning of the disorder, had gripings, with fetid and frequent stools ; their pulse was small and quick, their restlessness and weakness were very great ; but these symptoms abated

after

after the usual evacuations, the pulse and strength increased, and the fever took its course as in the others, but the number of these was very inconsiderable. In some of these, but not in many, some small milliary red spots appeared, which shortly after went away, and were seen principally about the fourth, fifth or seventh day, but they indicated nothing, for when they appeared, or disappeared, the patients were neither better nor worse. I saw two whose parotid glands swelled very fast at the decrease of the disorder, and suppurated with a remission of the fever and symptoms. They recovered flower than the others, though the ulcers caused by the lancet were easily cured. At last, if nothing retarded the course of the fever, the crisis came on, and that for the most part about the thirteenth, sometimes the fifteenth, nay even so long as the seventeenth day, with a profuse sweat, an easy expectoration, gentle stools, and a sediment in the urine. If, at the beginning of the disorder, symptoms of a colliquation

Z                   appeared,

appeared, or it happened that the vital powers were weakened too much from any cause whatever, the disorder lasted longer, the event was less prosperous, and the crisis more imperfect. But the methods which nature chose for throwing off the morbid matter, were not the same in all. The most perfect crisis was formed by the four evacuations abovementioned. But in many, one or other evacuation was stronger than the rest: in some it operated slower, and in others quicker; but in those whose crisis, as I observed before, was performed by the lungs, the sediment in the urine was white. But this way was sometimes unsuccessful, for through the excessive weakness of the sick, and the great quantity of white matter, of a middling thickness, which was excreted in the bronchiæ, and they could not spit up, I saw two persons choaked, and the matter issued from their mouth after death. On opening their bodies, the bronchiæ were overflowed with matter, but I found no sinuses in the lungs, nor any traces of a preceding vomica:

others

others for a long time threw up purulent spittle, and very narrowly escaped a consumption : but many, whose strength was capable of exonerating this viscus, were happily restored. I have however observed, that this evacuation has chiefly happened in men who had taken a good deal of Peruvian bark, or for any continuance ; but whether that arose from the bark itself, or from the natural disposition of the sick, I do not pretend to determine. But I have often observed, that the event in these fevers, at least in this class of men, was more successful, if I gave the bark in small quantities, than if I administered larger doses. But at the same time my patients were more languid ; in some it heightened the disorder, which was not otherwise violent, and heated them prodigiously, on which account I never gave it, unless where symptoms of a dissolution of the fluids appeared, in which case it was very requisite, as will appear hereafter. Lastly, they all became bald, and lost all the hairs off their body after the

Z 2 disorder.

disorder. Their recovery to their usual strength depended on the crisis being more or less perfect, as the more perfect it was, the sooner the sick recovered their bodily health and strength.

2. But this contagious disorder made its attack in quite another manner upon the weakly, who had been troubled in the winter with the Scurvy, and were not perfectly cured, and on those who had suffered but slightly from it, but were those commonly called sluggards. Almost all of these complained at first of a great loss of strength, offensive breath, and a bitter taste in the mouth, a dislike to food, of pains in the head, and about the heart, and great anguish, and lastly in particular, of frequent changes from heat to cold. Their pulse was sometimes a little higher than usual, sometimes lower, but was very little different from its natural state, any more than the heat of the skin. They continued thus sometimes for two, three, nay four days, so that they almost seemed not to be sick at all; but when they got out

out of their hammocks, and attempted to walk upright, they immediately fainted away, from which they soon recovered, when in a horizontal posture, and were just as well as they were before they fainted; their face was pale, and their eyes languid, some sweated very much, others but moderately all over their bodies; their tongue was moist and white, and very often surrounded with a green edge. These men had coverings and cloaths; where they had not, their skin was dry, they had gripings, with frequent copious and offensive stools of a black colour; after they had sitten upon the close stool, they very often fainted away; their tongue was rough, dry and blackish, and they were very thirsty. The greatest part of them never sweated, nor had any immoderate loose stools, yet, like the others, they gave up all hopes of recovery. They could not stand upright or walk without fainting away, their tongue was moist, white, yellowish, or green, nor were they very thirsty, they knew not what was the

matter with them, but said they were very uneasy and very weak. When I observed their great dejection of strength, I attempted to strengthen them by warm cordials, being fearful of their not being able to bear evacuations ; but I found these remedies ineffectual, nay, that they even increased the anxiety. In the mean time I observed, that the pulse and the heat increased of its own accord the third or fourth day, as well as the other symptoms of the fever. But I imagined, that the cause of so great a debility was in the primæ viæ, and that it could not be corrected by remedies in them ; on which account, laying by my fear as soon as they began to be taken ill, I gave them a vomit, and that as well in the morning as in the evening, but I took care that it should be given them in their beds, contrary to the general custom on board of ship ; and by this expedient alone I found that the pulse increased, was full and quick, that their strength and heat increased together, that their uneasiness abated,

abated, and that the fever took its course as abovementioned very much to the ease of the patient, so that this remedy was of service to all. But sometimes in this class of sick, colliquative sweats and purgings continued several days, which weakened them very much; but when properly treated, and sometimes of their own accord, they stopped after the third, fourth, or fifth day. Their stools sometimes continued to be loose to the end of the disorder, but very often from being black, turned to a yellow colour, of greater consistency and of a fœtid smell. Those who did not sweat, and had no purging, after they had vomited, if they were restless, and their pulse was depressed, were much relieved by opening a vein, which I sometimes repeated with great advantage. But when they had taken too many hot remedies, the pulse indeed rose for some days, and a great heat came on with a twitching of the tendons; the pulse afterwards subsided, the heat and twitchings abated about the seventh day; on the ap-

Z 4 pearance

pearance of red, and sometimes livid spots all over the body, particularly on the thighs and legs, those which came out upon the breast and arms were as big as lentils, but upon the legs and thighs they were of different sizes and shapes; so that some of them were an inch in diameter. The pulse was small and tremulous, and the whole body was covered with a profuse sweat, of a sweet and disagreeable smell. Those whom I bled during this heat, their pulse generally subsided after the first or second bleeding, and black spots appeared. Many of them, besides, bled at the nose, during this very heat, which if they did largely, had the effect of venesection. But in those to whom evacuating medicines were given too late, so that through the delay too great a quantity of the depraved matter was mixed with the circulating fluids, and exerted all its power in promoting a putrid dissolution of those fluids, or by absorbing them successively, produced the same effect on the humours; and in those likewise who had symptoms

toms of colliquation from first to last, the pulse increased but little, the tongue was moist, and grew whiter every day, their whole body was in a profuse sweat, and they had great purgings, which lasted sometimes for seven or eight days, and to the very hour of death, so that their whole body seemed to dissolve into sweat and fæces. They lay upon their backs very quiet, and inattentive to every thing, asking for nothing, complaining of nothing, and regarding nothing; they seemed slightly delirious, but on being asked a question, gave a pertinent answer to the hour of their death. Their pulse was small and tremulous, and they fainted away on the least motion. I must not forget to mention here the effect which blisters had on this class of patients, which, when applied, not only raised bladders, but corroded the epidermis, the skin, and the cellular membrane, nay, sometimes deeply affected the muscles themselves, and left ulcers very difficult to heal, so that in many of them they were open for some months.

months. In those whose pulse and heat on the first days of their disorder increased, and the symptoms of a colliquation of the humours disappeared, the fever, when the crisis came on, was cured, as in the foregoing number; but when the pulse remained depressed, and the sweats and purgings continued longer than ordinary, there was no concoction or crisis, their urine was pale and thick, like that of horses; if things took a more favourable turn, it was more coloured, and had something in it cloudy; if a worse, it was foul, and generally covered with a cuticle of oily sky-coloured matter, nay, sometimes drops of oil were visible on the surface, and about the sides of the vessels. I always observed the urine to be of this kind in the sick of the following class. They, as near as I could guess, were at least fifty, of which however only a few died; but though very much weakened, yet when the disorder was gotten under, they were soon restored, and grew fatter,

more

more fresh coloured, and more alert than before their sickness.

3. Of this number I only saw five or six. Their gums before the fever had been slightly swelled and ulcerated ; their breath stank, and they had red and livid spots on their legs. Two of them had their knees and legs swelled by the Scurvy, but all of them were able to walk about the ship, and upon deck. But indeed they had scarcely felt the effect of the foul air, before they were seized. At first they had shiverings, a sickness at heart, and an uncommon weakness ; they complained of nothing like those of the second number, whose disorder changed for the worse ; their pulse was soft, their heat natural, their tongue white, blueish, or greenish and moist ; they lay upon their back from first to last ; they had slight twitchings of the tendons, or rather a trembling ; the first or second day of their illness they had a most profuse sweat all over their body, of a sweet and unpleasant smell. Then their pulse by degrees got lower, the sweat

continued

continued so profuse, as to get through their hammocks and coverings, by which in a few days they were so weakened, that on the least motion they fainted away, particularly if they had a purging, so that some of them died in three or four days. They who lived to the seventh day were saved by taking Peruvian bark in large quantities. All of them were very stupid, but none of them totally delirious. If I asked them how they did, some of them said they were pretty well, others that they were dying; if I offered them any liquor, on being asked, they would sometimes drink, and were very fond of cold water and bitter decoctions: they would not drink acids of any kind, not even wine; and though they were noted drinkers before, said that it burnt up their insides. They refused all manner of nourishment. They who took Peruvian bark time enough, and in a sufficient quantity, though they kept their beds for seven, eight, and sometimes ten days, and frequently fainted away, recovered

vered by degrees, and the symptoms of the Scurvy disappeared at the same time. They who died on the first days of their illness were livid all over, and had scorbutic spots as black as ink. The blood of the sick in the first class was sometimes of a fine red, at other times blackish, thick and ~~very~~ glutinous; on growing cold it was covered with a white or yellow, or sometimes a greenish pellicle. This sometimes did not appear in the blood on the first venesection; in the second it generally did, and never missed in the third, if it had not appeared before. The blood in those of the second class was nearly the same, which separated its serum sometimes in greater, sometimes in less quantities like the first, but it generally appeared blacker and more dissolved, and scarcely would coagulate, particularly if the disorder lasted for some days, and went on increasing. The pellicle then which covered the surface of the blood was blueish, and of small consistency. I bled none of the third class. On opening  
the

the bodies of those in the second and third class, the blood in the larger veins was still fluid, black, and did not coagulate, although they were cold. The blood which I found in the ventricles of the heart was black, dissolved and fluid. Besides this blood, there was a fibrous concretion adhering to the columns of the ventricle of the heart, and extending itself to the larger vessels: this formed a coagulum, and was almost black; on being taken out, it appeared like packthread twisted irregularly the size of a straw, and was easily dissolved. Excepting the grey colour which the heart and the abdominal viscera were of, I found nothing particular in their bodies. I saw such a thready matter at the bottom of the right ventricle of the heart, in the body of a man who died of a slow fever, and the scurvy the last voyage I made. It was covered with livid spots. His blood was likewise very black and fluid in the larger vessels.

*On*

*On the Cure of the SYNOCHUS PUTRIS, or  
CRITICAL FEVER.*

1. If the sick of the first class in the beginning of their disorder had a hard, full, and quick pulse, and their heat was too great, I ordered venesection once, and sometimes twice in the arm. I prescribed a watery, subacid, or nitrous drink; the next day, if symptoms appeared of any depraved matter in the primæ viæ, I gave a vomit of ipecacuana, or emetic tartar. On the other hand, if the sick complained at the beginning of a pain in their præcordia, stinking breath, and a bitter taste in their mouths, above all other symptoms, I began by giving them a vomit, and afterwards if the heat came on, and the other symptoms were urgent, I ordered them to be blooded. If they continued to be troubled with stinking belches, and this bitterness remained one or two days, I ordered them another vomit, which gave them a stool very commonly,  
especially

especially if I mixed one or two grains of emetic tartar, with a scruple of ipecacuanha. Otherwise I removed the obstructions in the intestinal canal, by loosening medicines. To those who had frequently stools with gripings, I gave a drachm of powder of rhubarb after the vomit, this often purged them, and removed the matter which irritated the membranes of the intestines; by which means this symptom generally abated, or ceased entirely. If besides, these symptoms of heat and fulness still continued, I ordered the patient to be blooded once or twice *pro re natâ*. The young men, and those of a robust constitution, generally required it. But what we mentioned in §. 3, of this chapter, where we treated of the cure of the simple Synochus, was here fully sufficient; but it was necessary to be more attentive to their diet. I did not at all regard their being bound at the going off of the disorder, or at its height, for when it was over they went naturally to stool.

Many

Many of the sick asked for cold water, which I very readily allowed them, for I saw many of them, who took few or no remedies, entirely recovered by drinking this alone. But if they drank too plentifully of it, they were restless and uneasy, and had crude sweats, which however went off in a short time: if, in the three first stages of this disorder, they were too much bound, I removed that by decoction of tamarinds, or cream of tartar and manna. If they were very thirsty, and the aphthæ rendered their swallowing difficult, and they were bound at the same time, I gave them every other day a draught, made of two ounces of oil of sweet almonds expressed without fire, with half an ounce of syrup of violets or marshmallows; by which they had one and sometimes two stools, which relieved them greatly. When they were troubled with aphthæ, and their tongue was greatly parched, I made them very frequently take the following eclegma. Take half an ounce of spermaceti dissolved in the yolk of an egg,

A a

two

two ounces of oil of sweet almonds, an ounce and a half of syrup of violets or marshmallows, and two ounces of white honey; I used often to add some nitre or camphire to it. Besides this, I ordered them to drink of ptisane or emollient decoctions in small quantities; by which means they swallowed with more ease. When they were very delirious, I found that cataplasms and blisters applied to the soles of their feet relieved them greatly; though in the beginning of the disorder, or at the height of it, they seemed rather to increase than lessen it. Those who had a heavy and oppressive pain in their heads about the decrease, and who were sleepy and lethargic, were much relieved by blister plaisters applied between the shoulders, or to their legs, and sometimes to their arms. I observed moreover, that about the decrease, the pulse subsided on a sudden, that tremblings and convulsive motions were the consequence, and that these plaisters contributed very much to raise the pulse, when these convulsive agitations

remit-

remitted. Those, whose pulse about the decrease was lower than it ought to be, were raised by a little wine; if that did not answer the purpose, the pills, which will be mentioned hereafter, almost always did. Those of the first class, whose colliquative sweats and purgings continued too long, or whose remissions from the fever were great, took Peruvian bark. But though that medicine prevented the fever from getting to a greater height for some days, yet it did not produce a good effect; for the sick were rendered more languid by it, nor were they cured sooner, for the fever generally got to a head again, and they were much worse than those who did not take it; but in the others, it served to strengthen and to raise their pulse. At the decrease I gave them but few medicines, particularly if there were symptoms of concoction, which very often appeared the ninth or eleventh day. The urine then was cloudy, and after a few days let fall a sediment, and all the symptoms became milder, except the

A a 2                      sleep-

sleepiness, which frequently remained as well as a slight delirium. Thus, for the most part, the crisis came on the fourteenth or fifteenth day, sometimes on the seventeenth, but the disorder very rarely extended beyond that term. Those who a short time after the crisis had not a return of appetite, took two scruples or a drachm of rhubarb, and sometimes every day some bitter infusions, but few of them stood in need of this assistance. Those whose crisis was performed principally by the lungs, were relieved by expectorating medicines at first; afterwards I took care that the redundant fluids should be drawn from the affected part, by means of gentle evacuating medicines, and at length they were restored by balsamics and Peruvian bark. By this simple method, at least one hundred and fifty of them, though they were dangerously ill, were entirely recovered. Indeed I have been surprized sometimes, when I have seen a number of men lying six or seven days upon their backs in a deep sleep, totally deprived of sense

sense or motion, as if they had been in an apoplectic fit; whilst their comrades were every day pouring in barley water, or cold water into their mouths, which they were not able to swallow sometimes, on account of the aphthæ; and that for all this they kept their strength to the fourteenth or fifteenth day, nay even to the seventeenth, on which they had a manifest crisis. Their pulse on the critical days was low, and sometimes intermittent; it continued so sometimes for a whole day or more, so as to make me despair of their lives: but nature got the better, and their natural pulse returned, though they were very weak. They saved their lives perhaps solely by the use of wine, which was frequently given them by a spoonful at a time. In this manner I watched the motions of nature, and when the primæ viæ were cleared, the particular symptoms of the fever not urgent, and the sick not too weak, I gave them as much liquor of any kind as they wished, and ordered them no other nourishment, or if any

very light, and left the rest to nature.

2. As I was sufficiently soon convinced of the effect of hot stimulating medicines, in the second class I attempted to cure them by a vomit, which I was often obliged to repeat. There were some of these men, who, though they took a vomit twice, which operated sufficiently, were still troubled for some days with retchings, stinking belches, bad breath, and a bitter taste in their mouths; in which case I ordered half a spoonful of the following mixture: take three drachms of pure nitre, three ounces of lemon juice fresh squeezed, a sufficient quantity of sugar, and four grains of camphire, dissolved in some drops of distilled oil of mint, M. I have also ordered, sometimes with good success, *Riverius* saline antiemetic draught; I blooded once or twice those whose pulse did not increase after the vomit, who had not more stools than usual, and had no colliquative sweats, but seldom repeated it, though the heat and pulse were very strong;

strong; for if I took away more blood than needful, the pulse on a sudden subsided, and became tremulous, attended with a sweat and petechiæ. But when a proper quantity was taken away, it always relieved the patient greatly, and recovered the pulse and strength, particularly if they took the following pills. Take two drachms of the extract of Peruvian bark, three drachms of the root of contrayerva powder and of Virginia snake root, a drachm and a half of sal. volat. cor. cer. half a drachm of gum of camphire, dissolved in forty drops of *extract. essential. of saffron theriac. androm. qu. sat.* so as to make one hundred and twenty pills, of which I gave them three or four every day. Thus, by giving them these pills, they were in general brought to the first class, and grew much stronger. Some of them, about the sixth or seventh day, had some small red spots break out on their breast and arms, which disappeared again of their own accord; but I did not find, that either on appearing or disappearing they affected the patient

in any way. I ascribed this to taking too great a quantity of the pills; the liquor which they drank was the same which was mentioned in No. 1, unless that in general I suffered the sick of this class to drink a little more wine. If the sick sweated moderately, and had a low and soft pulse, attended with a great weakness, they found great relief from drinking a little more freely of wine, and from taking the abovementioned pills without opening a vein at all. But when their sweats were too profuse, and they fainted away frequently; I sometimes gave the same remedies, but Peruvian bark given in large doses was far superior to all other remedies; nay, by the assistance of this alone, given in time and due quantities, I have not only once, but several times, seen people recovered in the most desperate cases, particularly if they were fond of subacid liquors, but they often disliked them, and preferred cold water. This most wholesome remedy the bark was not less effectual in the cure of those, who were covered

vered with spots and petechiæ ; but though this remedy was of great service in whatever way I prepared it, yet I found that the tincture of bark, according to the Edinburgh dispensary, given often in a proper vehicle to these, and to the patients of the third class, was of greater service than any other preparations. I made up and prescribed the same tincture with success, after the London dispensary, with a double quantity of strong wine. I gave those who had too frequent purgings after the vomit a drachm of powder of rhubarb, which removed that disorder, especially if they had hammocks and coverings. Those who had not, were generally greatly tormented with this symptom during the whole time, and I every now and then repeated the dose of rhubarb, and on taking this powder, if it did not entirely remove the disorder, their stools however were not so fœtid, and their complaints more bearable. Those whose purging was stopped on the first days, and sweated, were a great deal better, and bore this

evacu-

evacuation more easily than the other, but it happened sometimes that their purging stopped without any other evacuation succeeding it, and then they were troubled with a swelling of the belly ; in this case they were seized with great anxiety, but were always relieved by a spontaneous or forced evacuation. If about the last stage or the height, the evacuations lessened or ceased entirely, it was always a good sign, if it was not occasioned by the medicines ; on which account I never meddled with astringents, but I always took care to use that which I have prescribed for those who had a colliquative sweat, unless that I spared the bark in some measure, when I gave it to those whose tongue was dry and black ; but when that was moist, and the primæ viæ were cleansed, it was always of service. But if the sick had violent pains in the præcordia or bowels, I ordered them cordial, aromatic, and antiseptic applications to be laid on the hypogastric region, or the whole abdomen. Those of this class, who in the beginning of the disorder

disorder had an increased pulse and heat, had a crisis to the fever the fourteenth, fifteenth, or seventeenth day; and they were cured as abovementioned in the preceding number. But when their sweats and purgings continued very long, they were like the sick of the third class, there was no concoction or crisis, and though there were sometimes symptoms of them, yet they were always spurious, and the sick recovered their strength with very great difficulty.

3. With respect to the sick of the third class, as their spirits were low, and their strength debilitated, I gave them no evacuating medicines, but had recourse immediately to the Peruvian bark as the best remedy. I ordered antiseptic applications to be put to the abdomen, the wrists, the calves of the legs, and the palms of the hands, and the soles of the feet. If they chose to drink acid liquors, I gave them water made subacid, with some spirit of nitre or vitriol, or lemon juice, but they did not drink much of it. I gave them

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the bark in decoction, to the quantity of two or three ounces every day, in small doses, but often repeated; this I continued some days; I then prescribed the bark with wine, or the tincture. It is very astonishing, that the sick were not only greatly refreshed by this medicine given them in time, but likewise so effectually recovered, that not one symptom of the original disorder remained, and they became as alert as usual. But from this contagious disorder being thus gotten under, it appears very clearly, that it is not of so malignant and fatal a nature, as the disorders of the sailors are generally supposed to be. Since if some of them were seized with a true putrid and malignant fever, as was the case in the second and third class, their own habit of body disposed them to it, and not the nature of this disorder. For the difference between this and the true putrid fever, may easily be gathered from what has been said above. On which account, from the very small number of the sick, it cannot be called

called by the name of a putrid fever, unless we are to judge of the whole by a part. The easy cure of the first, and the greatest part of the second class, of the sick, together with their speedy recovery to their usual strength, abundantly demonstrates this assertion. For at the latter end of April we left this harbour, and then there were a great number of sick on board, but on the nineteenth of May, we came to an anchor in *Alona* road, where it was impossible for any one to imagine that the men had been so dangerously ill. We saw likewise with astonishment, not only the good sailors and the boys, but also the slothful and inactive, almost all dancing about and amusing themselves, having more florid countenances, and a greater share of health, than before their very severe illness. So that besides their eyes being weak, and the ulcers which were occasioned by the blisters, no traces of their late illness appeared. As to the fatality of this disorder, though it was not very great, yet I have no question that it would

would have been less so, if a good physician had attended them in time, one who had been acquainted with the disorders incident to seamen; who should have had sufficient time to consider their cases, and given them the requisite assistance; which was so far from being my case, that one of the assistant surgeons, when this disorder first broke out, was confined to his bed by a fever, and the other was of as little service to me, on which account I was obliged to act as physician, surgeon, and apothecary. For if I had not been so much engaged in so many different offices, I could certainly have been of more service to the sick. Besides this, I was taken ill myself with the same disorder; from whence it is not to be wondered at, if one considers the many inconveniences on board of ship, that some circumstances escaped me in the treatment of it, or were but slightly attended to; and which, tho' afterwards observed, yet could not be corrected, and thus were fatal to the sick. I have seen this fever very often in the

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French hospitals, and amongst the soldiers out of the hospitals. But in the years 1746 and 47 it raged very violently amongst the soldiers of the Swiss regiment of *Courten*, in garrison at *Brussel*, where it particularly attacked those who lived in the lower parts of this city, but afflicted those rather less, who lived in the higher town; which difference the very learned Pringle takes notice of, when he says, that this disorder is more common in damp than in dry quarters. The marines on board the ships called *Welvaren Van het Land*, captain *Van Haffen*, and the *Pollux*, captain *Van Hoy* at *Helvoetsluys*, had lately the same disorder: though it was called the plague, it was no other than the *Synochus putris*. For I often visited the former with a very ingenious surgeon, one *Schwaan*, and also saw the latter a few times; it was exactly the same disorder as that which I have described, except that on board the latter, some of them had their extremities gangrened by the cold; nay, there were some of them who had the disorder more favour-

favourably than on board our ship. I have met with the same disorder in other voyages, as well in ships which I have sailed in as in others; and have always cured it by the above method, nor did it always attack the whole crew; if it was checked in due time, it was by no means contagious.

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## C H A P. II.

*On Disorders which occur in Harbours in warm Climates, in Summer or Autumn.*

I. **T**HE reason why summer and the hot seasons of the year are in my opinion more wholesome for seafaring men, has been explained already in the Preface, and in the second part, §. 1, 2, 3. Besides this, daily experience tells us, that the sailors at those seasons are not so often ill by perspiration being stopped, and that they are free from many hardships, or at least bear them better than in cold climates; neither does it appear, that a

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warm and pure air is unhealthy, unless it be immoderately hot, for those who live temperately, are healthy in warm climates as well as in cold ones, and arrive to a great age. But I would not be understood to mean, that those are more wholesome in general, than moderately cold climates, where the body is stronger, and more able to perform its functions; though I would not hesitate to pronounce that the summer heat, such as we feel on the Dutch coast, in the Spanish seas, or the Mediterranean, and the harbours thereabouts, from the abovementioned causes, and from the more equal temperature of the air, is more wholesome for sailors than cold weather. And although in warmer climates seamen are sometimes sick, yet it happens much less frequently than in cold ones, and the disorders are of a milder nature, unless other causes conspire with the heat; and when that is the case they occasion disorders, and those very fatal ones, which will be spoken of hereafter. I intend at present to take notice of some disorders

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of less importance, which are met with in warmer climates, and often in failing to them. Now it often happens, that when ships from a cold or temperate climate go very precipitately into a very hot one, as for example under the torrid zone, that the men are seized with symptoms of a plethora, and particularly with very violent pains in the head, which begin at sunrise, and increase with the heat, but abate a few hours after its setting. These pains, indeed, unless they are very violent, are seldom attended with a fever. When they have these symptoms the men avoid the light as much as possible, and get into any dark corner they can find. These pains seem to arise from too great a rarefaction of the fluids, from their increased volume; and from the greater compactness of the solids which resist the fluids too forcibly; by which the very tender vessels of the brain are too much swollen, distended and inflamed by larger globules entering the vessels, than their diameter will admit of. These dreadful pains in  
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the head and inflammations, are thought to arise likewise from the scorching rays of the sun striking vertically upon the naked head, which often happens on the coast of Spain, and under the torrid zone; on which account the inhabitants of these climates very carefully avoid exposing themselves to it. In a voyage I made to the West Indies, vide Part 2. §. 3. many of the men had violent pains in the head, but found relief by rest, opening a vein, and bathing their feet in warm water, as also by cooling liquors, which abated the motion of the fluids; sometimes also from the compactness of the solids being relaxed by the heat, and the due equilibrium between solids and fluids being restored, the disorder went off in a few days. Other disorders besides these arise from immoderate heat, which, though not fatal, are yet excessively troublesome to young, alert, choleric people, who breed a good deal of blood. Prickly heats or strikings out, which are owing to too great a relaxation of the membranes of the vessels,

the acrid humours being drawn towards the skin, which does not sufficiently resist the fluids, by which they get out of their place, whilst the red globules get into the serous or lymphatic vessels, by which means small red pimples arise, which, as the heat increases, and with the slightest motion of the body are so numerous, that there is hardly a part of the body, excepting the face, which is not red with them: these, I say, disappear entirely, or in part, by rest, and by the coolness of the evening; but the next day, as soon as the heat comes on, or the body is in motion, or by only a draught of cold water, they shew themselves again, and are so troublesome, that you would think there were as many needles run into your body, as there are pimples. At night likewise if you lie warmer than usual, or in a place filled with warm vapours, as is generally the case between decks, they are then exceedingly painful, and the whole skin is just as if there was an erisypelas all over the body. With these there are a number of boils,

boils, which at first are red, and afterwards of a purple colour ; they generally continue hard for eight or ten days or more, and then after having been very painful, they are gradually discussed, or terminate in a suppuration ; however, before they entirely disappear, they leave livid spots which continue a long time. These very troublesome symptoms are considered by the inhabitants as signs of health ; but according to the best observations I could make, they are so far from conducing to it, that they serve no other purpose than that of causing pain, and disturbing one's natural rest. Besides, they who are troubled with this disorder are tempted, though in a violent sweat, to expose themselves to the wind and cool air, for the sake of a little ease, by which they very often catch still more dangerous disorders. But what is more, there is hardly any remedy by which they can be cured safely, except by the weather growing cooler, or by cold bathing frequently repeated, which is not always adviseable.

Some methods which tend to contract the pores of the skin are prescribed for this purpose; but I think it more prudent to bear the disorder patiently during the stay in such climates, than to apply to them. But if these prickly heats shew themselves in a person quite healthy, a cold sea bathing may be safely and successfully used, which in these climates will strengthened the body very much. Besides these, sailors are frequently liable to dreadful spasmodic disorders in warmer climates, which attack them particularly at night, when sleeping in the open air, and arise from perspiration being suddenly stopped; for it often happens, that the sailors are very hot in the course of the day, and expose themselves very carelessly to the nocturnal cold, with very few cloaths on their back, and get up in a profuse sweat to watch, and fall asleep in the open air, by which their whole body is sometimes as stiff as a piece of wood, and are seized with a tetanus in many parts of their body, particularly in those which are exposed

posed to the air; as for instance, the jaw bones, which are forced together often so strongly that they cannot be separated; or some of the muscles only are stiff, by which the whole body sometimes, or perhaps the head only, is drawn forwards or backwards, or they are alternately contracted and relaxed. These disorders frequently continue for some hours, and afterwards terminate in a profuse sweat all over the body, or else abate only for a few hours, and then come on again, harrassing the patient for one or two days alternately, before they go off entirely. But those whom I saw afflicted with these disorders, were happily restored by venesection repeated *pro re natâ*, particularly if the pulse was full and quick, by manual frictions on the afflicted parts, by warm and gentle diaphoretic drinks taken in large quantities, and by opiates, and this for the most part on the first or second day. I saw only one whose spasm continued for three days, but yet he recovered. It remains now to mention something with re-

spect to the vena medinensis, or guinea worm; but as I never met with this disorder on board the ships in which I have sailed, I think it sufficient to give an account of what I saw, respecting that disorder, in the island of Curacao, where it is very frequent. This is a white yellowish small worm, generally above an ell long, which is very frequently found under the skin of the legs, hands and feet; and having occasioned a very painful swelling there like a carbuncle, at last perforates the skin; in the place which is perforated, the epidermis is separated from the skin by the effusion of the ichor, which raises it into a blister; on opening this, an animal or worm like a thread appears, with a small black head, which, if the surgeon can get hold of, he extracts gently till he feels resistance, or the patient pain, which is generally the case, if it lies too much involved in the cellular membranes, or about the more sensible parts. But the person who extracts it is always very careful not to break it, for which

which reason he rolls the extremity of the worm round a bit of twisted paper, or a bit of cloth, lest it should work itself in again, and then covers the tumor with an emollient plaster or ointment. This is repeated once or twice every day, during which they try whether they can extract any more of the animal, and proceed thus till they get it entirely out. If they are able to do that, the pains go off of themselves as well as the swelling; but if they break it, and the worm dies under the skin, it occasions pains by putrifying there, and produces an abscess, so that the patient can only get rid of it by suppuration; sometimes if it does not lie very deep, they draw out the worm at one time, which Mr. *Dorffel*, a very able surgeon, once did in my presence. When it was extracted, I put it into warm water, and could see it very distinctly moving about for some time. I saw many in this island troubled with this disorder, whom Mr. *Leiffing*, a very skilful surgeon, carried me to see, many of whom had a number

number of these worms at one and the same time, and had their limbs very much swelled by them, and very hard. They all declared, that while the tumors were forming, they had been troubled with shiverings and a fever for several days, which went off in proportion as the swelling came to ripen.

The Europeans whom I saw that had this disorder were so much in pain that they could not walk ; but the negroes, though they have a great number of these worms at a time, continue working on, and do not regard them ; for except that they extract the worm gently, if they can get hold of it, they take no other method with it, but let the extremity of it hang out like a thread in the open air, by which it grows dry ; nor are they afraid of its going in again ; thus they go on trying to get it out, till they have extracted it entirely, and perhaps they get rid of them more easily by their hard labour to which they are driven, than the Europeans by all their care. This is the only

only method which the inhabitants of this island use to get rid of these troublesome companions, nor do they hardly ever send for a surgeon, who if called in takes no other steps. The use of corrosive sublimate of mercury dissolved in malt spirits, lately recommended in this case, was at that time unknown in that island : on that subject, *Vide Galand, &c.* But the sailors are often contagiously seized with this disorder, particularly if they stay long in these places, and are connected at all with the Europeans and negroes who have the disorder ; but that it is contagious is very evident, as it never is in a house without infecting the whole family, because these little animals and their seed are carried about in the bodies of the living from place to place, and communicated from one to the other. Some of the inhabitants of this island, people of credit, have told me, that this disorder is not of very long standing amongst them, and that it was brought there by the negroes who came from *Guinea*. But it does not seem capable

capable of being propagated in our climate, though it is often brought into Europe with the ships which come from those parts, but stops there sooner or later, according to the temperature of the air, by which it is sooner or later eradicated. But the seed of these worms often lies concealed in the body for some time before it shews itself. I recollect a remarkable instance of this some years ago in the Mediterranean, in a Dutch man of war, which came from *Curacao* to *Holland*, before she went to the Mediterranean. Neither in *Holland*, nor in the island, nor in her whole voyage, did any symptoms of these worms appear; but after a short stay in the Mediterranean, above a third part of the crew was confined to their hammocks by them, nor were the sailors only troubled with them, but the officers likewise. These worms may be taken into the body with the food, and driven with the blood and fluids towards the skin, or creep into the pores of the skin, which seems more probable in my opinion,

nion, and communicate themselves like the itch, which may be conjectured from their infecting the parts mostly which are uncovered, and seizing principally those who walk about with naked feet. What has been said may suffice with respect to the slighter kind of disorders, and as neither our design or our leisure permit us to dwell long upon them, we shall hasten to others of a more important, and more dangerous nature.

2. But as there is nothing which throws more light on our subject than the actual knowledge of the body; on this account, before we proceed further, it will be necessary to examine what the habit of body is in summer and in warm climates, and necessarily must be; or what effect a warm summer air is capable of producing on the human body. If this is properly considered, it will easily be comprehended, why we escape several disorders in summer, and are liable to others. But I shall explain in a few words, in what manner a warm air disposes the body for disorders.

It

It is a physical truth that heat ratifies all bodies, excepting some few not necessary to be mentioned here; by getting into their most secret recesses, it separates the parts from their mutual contact, and increases their porosity, whence we daily observe that bodies increase by heat, and decrease by cold; but by thus diminishing the cohesion of the parts, it not only relaxes the solid parts of our body, and weakens them, but expands the fluids and increases their compass; it diminishes the force of the cohesion of the globules, by which means they become looser and more slippery: but when it proceeds to act upon the moist parts of the body, they resolve into vapours, and the intestine motion is greater, by which means the thinner part of the blood is too much thrown off, and the glutinous part which nourishes the body is too much divided and dissipated. The thinnest particles of the blood being thus evaporated, the oleaginous and terrestrial parts become too sharp and saline; on this account, the  
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longer the heat lasts, and the more intense it is, the more adust, acrid and volatile the fluids must be; particularly if they are not sufficiently washed; the useless and worn out particles properly thrown off, and a successive renovation made by proper food instead of them; for without this condition of the fluids, the requisite temperament on which nutrition, health, strength, and life chiefly depend, cannot be kept up. If, besides this, the way of living amongst the sailors is taken into the account, who not only very often want water, but even good provisions, it may easily be supposed, that sailors must suffer very much by this; for the continued thirst, which they almost constantly have, is a sufficient evidence, that the quantity of water which is allowed them, particularly in long voyages, is scarcely sufficient for diluting their food, and cleansing the fluids. For this thirst, by tempting them to drink water plentifully, shews us at the same time, that the fluids abound with salts, which, if dissolved in a proper

per quantity of water, would be carried with them out of the body, but now are retained. Besides this, it is clear that we stand in need of a sufficient quantity of water in warm climates, from the inhabitants of those parts, who, being taught by daily experience, drink water in very large quantities, but refrain totally from hot and fermented liquors, or use them with the strictest moderation, which is quite otherwise in cold climates, where they bear spirituous liquors very well, and stand less in need of water. Besides this, the water which the sailors drink is putrid and fetid, on account of the impure and putrifying particles, with which it abounds when kept in casks, or by the little insects which perforate the pores of the casks, and leave their putrid remains. And although this is the case sometimes in winter, yet it is never so offensive as in summer; if it once gets offensive, it continues so a great while on account of the cold, which retards the metamorphosis of these animalcula; now this is very different

ferent in summer, when it scarcely gets sweet, but a new cause arises for its stinking. It likewise often happens, that the water is impregnated with salts, by which means it is less wholesome, and when this kind of water stinks, it is more particularly offensive than any other. It happens frequently likewise in long voyages, particularly to the Indies, that by wanting water, the provisions are not properly dressed in the kitchen, or dressed in sea water entirely, or at least in a certain quantity of it. (See on this subject *part the second, cap. I. §. v. No. 19.*) where it appears, that another disorder proceeds from a want of water. But from what has been said it is very clear, that want of water in warm climates, where there is a great loss of moisture, must dispose the body for the reception of disorders, particularly if the water which they have is filled with putrid or other heterogeneous particles. But though these particles are very prejudicial, they are not so detrimental, as an insufficient quantity of water; for we may

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often take notice, that sailors will drink stinking water a long time, and yet continue healthy; the salt water which they drink is never so saturated, but if drank plentifully will be sufficient for the purposes of life; from whence it appears, that a want of water may be reckoned the most principal cause of disorders which prevail at sea, and so much the more, as it cannot be altered. But with respect to their nourishment, though it may fulfil all the requisites and be very good, yet it appears from what has been said, that it is very different from that which is necessary in summer, for the recovery of the parts which are worn away, and for the preservation of health. This should be fresh, free from all taint, easily digested, principally composed of vegetables, which temper the acrimony of the fluids, and are of an antiseptic nature; though amongst sailors provisions, those of a farinaceous kind are reckoned very wholesome, and seem proper for our purpose, by their acescent quality, by which,

*vid.*

vid. part 2. §. 4, they resist putrefaction. But that nourishment is extremely hurtful, which is drawn from substances difficultly to be dissolved, which tend to putrefaction, and cannot easily be assimilated, such as dried fish, and particularly cheese, which is often putrid, bacon, old oil, which is often given to the sailors instead of butter, and butter itself, all which things, and especially the last in warm climates, by being kept a short time on board of ship, grow rank and fætid; for it frequently happens in ships, and particularly in those bound to the Indies in a warm season, that this melts away like oil in the casks, by which is loses a great part of its salt, and the intestine motion being increased by the heat, it becomes bitter and stinks. It appears likewise from thence, that such a hard and gross food, not only resists the digesting powers very much, which on account of the relaxation of the solid parts are much more languid in summer than winter, but also that the juices drawn from them, though they are properly digested,

gested, yet are of a very acrid nature, and are not such as are requisite in this habit of the body, to temper the acrimony of the fluids; for it appears, that the chyle partakes of the nature of the food, excepting the thickness and tenacity of the fluids, of which I have already spoken, when treating of winter disorders; for I cannot believe that these (as a certain writer who treats of these diseases would insinuate) can be any great impediment to perspiration, for the heat, and the greater tendency to putrefaction at this time, alter the nature of the thing, as it cannot be conceived, that men who are in a most profuse sweat, as is the case in these climates, should not perspire. It is observable besides, that people, particularly seamen, when in these very warm climates, are rather too much bound through the cohesion of the solids being diminished, the peristaltic motion of the intestines being languid, by the dry and hard food likewise, and the too great loss of moisture; nay, it happens sometimes, that the

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excrement is so dried by lodging in the great intestines, by the heat, absorption, and loss of the liquid, that it is not only excreted with great difficulty, but very often contracts so great an acrimony there, as to affect the parts where it lodges, in a very disagreeable manner, and to occasion a tenesmus, by which it is voided with the most excruciating griping pains. It appears from thence, that the humours of the veins must be not a little tainted by such an acrid and putrid absorption ; from whence many putrid disorders take their origin, a circumstance not unknown to the inhabitants of these climates, who hold it as an axiom, that if they keep their bodies open, drink water, and do not indulge in venery, that they shall live free from disorders. From what has been said, it begins to appear, what the habit of the body is in warm climates, as well as the condition of the fluids, and of the juices secreted from them. If we weigh these circumstances, it will not be difficult to discover the reasons, why the occasional causes

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have so speedy and strong an effect on the bodies of sea-faring men, especially if those are retained in the body, which ought naturally to be thrown off, of whatever nature they may be. For as I have already said, it is constantly observed, that as long as the excretions, and particularly that of the skin, and that by stool are regular, so long the seamen will be healthy; and on the contrary, as soon as they are from any whatever cause diminished, retarded, or suppressed, so soon will those disorders shew themselves. But there are very often very terrible effects observable from the cuticular excretion being stopped, which appears from what has been said above to be very considerable in summer, and to exceed all the other evacuations taken together; for by this channel, a quantity of matter, which is useless in the purposes of life, nay, even very prejudicial, is thrown off from the body; but when this is retained in the mass of fluids, the bile (which, as it appears by its own alcalefcent nature, tends very much

much from our juices to corruption, and is from the abovementioned causes evacuated and highly saturated) is not only very powerfully disturbed and tainted by it, so as to cause appearances not less alarming, than those which are the consequences of taking poison, but likewise very speedily putrefies the fluids in the vessels; from whence it arises, that in summer and autumn, putrid and bilious disorders are so frequent, that other diseases scarcely acquire the attention of physicians. From hence likewise different species of disorders, though of the same kind and nature, distinguished only by the degree of malignity in them, arise, as the very learned *Pringle* has observed, and *de Monchi* likewise in the *Harlem* transactions, amongst which choleric disorders, hot bilious fevers, putrid, colliquative, spotted fevers, and the dysentery, deserve particular attention. The differences of these depend on the diversity, duration, and energy of the pre-disposing causes, particularly the occasional ones hereafter to be mentioned,

tioned, and on the particular disposition of the subject. From thence the reason is sufficiently clear, why, if the causes conspire, by which the necessary and salutary functions of nature are perverted, the disorder so suddenly seizes a body thus disposed to receive it, and why trivial causes, as they sometimes appear, should produce such fatal effects on sailors, which is not the case with men who live on shore, and in a different way. But amongst the very noxious causes which so speedily affect the body in warm climates, there is none so powerful in promoting disorders, excepting poison and uneasiness of mind, as a thick muddy moist air, which makes the whole body languid, accumulates the fluids, relaxes the fibres, and prevents all excretions, weakens the digestion, and disposes the contents of the primæ viæ, as well as the blood and the rest of the juices to putrefaction, more especially if it is impregnated with such putrid and heterogeneous particles, as are generally found on board of ship, *vid.*

*part*

part 2. cap. I. §. 4. part 3. cap. I. §. I.  
where I spoke of the causes in general.  
But it is observable, that a rainy season, if  
it does not continue too long, is not so  
prejudicial as a cloudy moist one without  
rain; that a rainy season at sea is less  
hurtful than in harbour, where the rain  
falling upon the earth is soon raised again  
into vapours, by the rays of the sun and  
the ground being warm; which vapours  
often continue a long time in the atmos-  
phere of the harbour, by reason of the  
high mountains, houses or trees, which  
prevent the access of the air. From  
thence it appears how much they are in  
the wrong, who think that the place  
which they call *Maygat*, in the harbour of  
the island of *Curacao*, is prejudicial to  
health, on account of the winds which  
blow pretty fresh, and dry their bodies,  
which are almost always in a profuse sweat,  
and therefore place their ships near the  
houses; by which means, whilst they think  
to avoid one evil by their precaution, they  
run into a worse, by placing themselves so,

as

as never to have the atmosphere of the ship changed. But such an unwholesome air is either general and permanent, as in moist marshy places thick set with trees, particularly in the Indies in a rainy season; or transitory, and soon passing off, as in the Mediterranean, when the wind is in the south and east particularly: I shall give an instance of the sudden change, which such an air occasions in the functions of the animal body. In the year 1759, on the 1st day of June, we went to sea on board the *Prince's Carolina*; on the 26th of July we came to an anchor in *Malaga* road. The season in which we passed the German ocean was a very rainy one, and very windy; afterwards it was very fine weather, which lasted till we came to *Malaga*. On the 27th, the wind blew from north and west as before; but on the 28th, it changed into directly the opposite; namely, the south and east, but the last was most predominant. The sailors enjoyed perfect health till that time, and their provisions were good: some of them,  
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but not a great number, as they had but little money, bought garden fruits and wine, but they lived very temperately all this time. On the 29th, 30th, 31st, and 1st of August, the wind continued the same, but there was not a great deal of it. The air was heavy and moist, yet there was no rain; nor was it so cloudy, but that we could see the sun. But on this last day, there were upwards of seventy men sick, who were seized in the following manner. They were generally taken immediately after dinner, with violent gripping pains, attended with an uncommon anxiety and heat about the præcordia, accompanied with thirst. This was followed by evacuations upwards and downwards, they first voided their food and excrement, and then a green bile. Their pulse was quick and small, their external heat was greatly diminished, which increased in some the second day, nay sometimes the first, with a fever; but the number of these was trifling, and all of them were in a profuse cold sweat. Some of them had

these

these symptoms for a whole day, and others for two, when at last the disorder terminated in a painful diarrhœa or fever. The second of August and the following days the wind being at north and west, three or four more were taken ill, but the sick began to recover, so that on the 8th or 10th they were almost all quite well. I could mention some similar cases to shew the malignant nature of the air when too moist, but this may suffice. It is moreover observable, that sailors have the same disorders, though such an epidemical kind of air may not occasion them; but then they seldom are general, and are of a milder nature. Amongst the causes which, besides the abovementioned, affect our bodies very sensibly, the passions of the mind may be justly added, as conduced very strongly thereto. With respect to their operations, *vid. part 2. cap. 2. §. 10.* hard labour also, particularly if performed in very hot weather, and if the men have been unaccustomed to it for some time. For by this the fluids are in an unusual

unusual manner put in motion too rapidly, and the bile is secreted in too great quantities, and falls upon the intestines, which before, by the too great relaxation of the parts, the inactivity of the fibres, and the want of motion in the body, was retarded in the vessels and biliary ducts, and in the gall bladder itself; the membranes of which it burns up, and corrodes by its acrimony, accelerates the putrefaction of the contents in the primæ viæ, and occasions pains, looseness, &c. &c. But as to the remaining causes, *vid. Preface* and *part 2. cap. 1. §. 5.* No. 1, 2, 3, 4, 10, 11, 12, 13, 14, (particularly at the end of No. 19.) 20, 21, 22, 24, and besides in *part 2. cap. 1. §. 3.* what is said on the caution which is observed, with respect to nocturnal cold in hot climates. From all which, the reasons appear why these disorders are epidemical in some places, and so destructive, and why they soon pass off in others, and are of a milder nature; and likewise why they rage universally amongst sailors, and very fatally

tally when the weather is fine. Having premised this, I shall give a brief history of the disorders. If the reader is desirous of a more diffusive one, he must consult the authors mentioned particularly in *part 2. cap. I. §. 4.*

*On the SUMMER BILIOUS FEVER.*

3. **I** Do not think it foreign to my subject to give a particular description of the burning bilious fever, which occurs in summer, and does not differ very much from the *Synochus putris*, mentioned in the preceding chapter, although many similar appearances very like each other are found in these fevers. For from the causes, the circumstances, and some of the symptoms which occur in this, and from the different method of treatment which it requires, it may easily be gathered, that there is in this a greater tendency to corruption and putrefaction in the fluids, than in the other; and experience moreover tells us, that they cannot be treated in the same manner with-

without great detriment to the sick. Although the characteristical signs of these disorders, especially at the beginning, are the same, yet the difference of the one from the other may be easily known from what has been said before, and what will be further mentioned. When these fevers seize healthy people, they have these symptoms in common; that in both there are pains about the præcordia, with an unextinguishable thirst, a vomiting of bile, or a retching, a parched black tongue, and a burning piercing heat all over the body. But in a *Synochus* the sick feel a shivering, and a remarkable sensation of cold, which often last a pretty long time; the pulse is hard and contracted, increasing by degrees as well as the heat. In the burning summer fever they feel little or no cold, and the pulse and heat increase very fast. In the first, if the pulse is contracted and hard, it is raised very happily by opening a vein once or twice; but in the other, by opening a vein twice or thrice, it becomes small and tremulous;

lous; the small pulse is generally totally lost by venesection. Besides this, venesection in the first removes the uneasiness of the patient, but in the other it lowers the patient's strength surprizingly, causes a trembling in the whole body, and occasions very plentiful colliquative sweats. In the first, the pulse is large and strong to the very end of the disorder; in the other very seldom so, and generally falls off of its own accord after the 4th, 5th or 7th day. In the *Synochus*, except the milliary pustules, no spots are observable, unless the patient is improperly treated; in the bilious fever, besides the milliary spots, there are petechiæ, and broad livid spots on the skin. In the first, the skin is dry and tight, in the other often soft and moist. Besides this, the bilious fever often changes into a black and fœtid dysentery, in which pure blood is sometimes excreted; when the first prevails, it is rarely attended with a dysentery. In the bilious fever, faintings when in a horizontal posture, and hæmorrhages, which indicate a loss of strength,

strength, and a dissolution of the fluids, are more frequent than in the other. Lastly, although a burning summer fever is very severe, it very often goes off on the ninth, sometimes on the tenth or eleventh day; it lasts also to the seventeenth, and afterwards is very frequently changed into another disorder, and from being continual, becomes intermitting; which is not the case in the burning winter fever, which never ends before the thirteenth, fifteenth or seventeenth day, and generally terminates with a crisis; this likewise happens sometimes in the bilious fever in summer, but not very frequently. I have often given great attention to this disorder, but I scarcely ever found six out of twenty, who had a perfect crisis. Symptoms of concoction were indeed often observable, but then they were generally spurious, and deceived the physician, who often saw appearances of a crisis which seldom came on, and in the mean time neglected the necessary remedies; so that a curable disorder often became fatal.

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Lastly, as I proved above by an instance, the sick often recover their strength surprizingly after the first fever, but after the other, they are languid for a considerable time, are liable to relapses, and mend very slowly. The worst degree of this fever will appear from what follows, for in the Indias it is very uncommon to meet with the burning bilious fever, like that which is seen in Europe. I saw the different species of this fever, in the hospital at *Fort Louis* on the *Rhine*, a place remarkable for its unhealthiness; it rages here every year very severely amongst the soldiers, whilst the citizens remain entirely free from it. From thence it may be inferred, that those who are accustomed to such an air, feel not the same effects from it, as those who only fejourn there for a time; and from this it appears, why soldiers and sailors are always afflicted with epidemical disorders, more than the old inhabitants. In the year 1749, I had an opportunity of seeing the different stages of this disorder at *Weissenburgb.* This city, otherwise healthy,

thy, was then surrounded or fortified by a ditch; but through the ground being wet, newlydug up, and exposed to the rays of the sun, a very dreadful epidemical disorder broke out, which affected but slightly those who lived in the upper part of the city, but was more destructive to those who lived rather in a lower part; but in the lowest, and the *Bitscher Suburb*, it raged like the plague; so that on the high spots of ground, it was a bilious fever of the mild sort, in the middle of the city it was the same, attended in many with colliquative sweats and petechiæ, but in the lowest parts, it was accompanied with colliquative sweats very fetid, petechiæ, broad livid spots, frequent hæmorrhages and offensive dysenteries. It was generally fatal in four, or at the most in five days; some few lived to the seventh day, but very few who had it survived. Their bodies a few hours after their death swelled, and were livid and offensive in the highest degree. When the soldiers were brought into the hospital, it was easy to know by

the symptoms what part of the city they came from. It was supposed, that this epidemical disorder was occasioned by poisonous exhalations from the earth ; but if we weigh all circumstances, we may easily gather from them, that it principally arose from a damp air.

4. If this fever is not violent, and the heat is great, venesection once or twice is very serviceable, but care should be had, not to take too much blood away, lest the patient should be otherwise more endangered. Afterwards the cure may be set about by evacuation, as in the synochus ; their drink should be water acidulated with some vegetable or mineral acid, nitre is of great use, and indeed every thing which conduces to temper the acrimony of the bile, and the too rapid motion of the fluids. If, when the body is cleansed, the pulse, the heat, and the agitation of the fluids remit about the fourth or fifth day, the cure is completed by Peruvian bark and bitter infusions, which must not be discontinued, tho' symptoms of concoc-

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tion should appear. I never found any bad consequences arising from these remedies, especially from the bark in this disorder, as in the synochus ; but I always found those who took it in proper quantities, restored sooner and better, than those who took it in smaller doses, and not soon enough. The other symptoms which are violent, and in common with the *Synocbus putris*, are to be treated in the same manner ; but if it is so bad as to be a real putrid fever, those remedies which I prescribed to the patients of the second and third class, and which are indicated in the following pages, will contribute to the cure of it.

*On Putrid, Colliquative, Spotted Fevers, the Cholera Morbus, and the Dysentery, which raged in the year 1760 amongst the Sailors, in the Harbour of the Island of Curacao.*

5. I Shall now continue the description of the voyage which I began, §. 3.  
part 2. cap. 1. The ship came to an anchor at the place called the *Waygat*, with her stern towards the east, in such a manner, as to lie open very fairly to the winds, which blew upon the stern and her starboard side. Every thing was done that could be thought of, for the preservation of the men's health on board. On the 26th of *August*, seven of the men were taken ill; at the end of the month, the number increased to sixteen. The mercury rose to eighty-nine degrees, and once to ninety, and fell no lower than eighty-three; there were two wet days during that time. In the month of September the number of sick increased very largely,

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so that by the twenty-seventh there were seventy-nine ill. The number afterwards decreased, and on the last day of the month was only fifty-four. The mercury at this time was from eighty-nine to eighty-three; there were six rainy days during this period. At length, on the 21st of October, when we began our voyage homewards, we had still thirty-one sick on board; the last of October we had only twenty. The mercury was between eighty-one and eighty-seven degrees. In this month there were seven rainy days, but the rains were not very violent. On the last of November, the number was reduced to four. The mercury was between seventy-four and eighty-four; there were only three or four rainy days, but it was very cloudy. In the month of December we had six ill on board. The mercury was between sixty-seven and eighty. In this month we had thirteen rainy days, and many very cloudy ones. In the month of January, the number increased to twelve. All these were troubled with the scurvy.

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In the month of February we arrived in *Holland*; all the time that we stayed in this island, the easterly winds blew very fresh, there were very few days without some wind. In the beginning of our stay there, as I observed before, the disorders which principally occurred were pains in the head, and bilious cholics, which were soon cured; these changed into choleric disorders, by far more severe and more dangerous than the former. These disorders began with a great heat about the praecordia, gripings, great anxiety and restlessness, succeeded by bilious stools and vomitings, with a great loss of strength. Many of them had a violent cold sweat; if these symptoms continued, particularly if a fever came on, as was the case with some, with a strong pulse which remained about ten hours, then their lips began to swell, and their face was wan. When the fever remitted, they vomited black blood very plentifully; the greater part of these died, and generally a few hours after the appearance of this symptom. Some

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of them voided by stool the same matter, but rather blacker, and of an horribly offensive smell : but some of these were cured.

Something similar happened to those who had the fever, although they had no evacuations. Others had the bilious fever in the common way, and, as nearly as I could observe, they were chiefly young men, or middle aged, robust, and alert before their illness. They had a heat about their præcordia, a vomiting of bile, or a retching, with an unextinguishable thirst. Some of these at first felt frequent changes from heat to cold ; they then felt a burning heat all over their body, their pulse was large, full, and quick. Their tongue was yellow, white, and greenish about the edge, and always moist. I attempted to cure some by vomiting them, and took away no blood. The second day, if the symptoms allowed of it, I evacuated the intestines by a gentle loosening medicine. In the mean time I gave them for their drink some water, with lemon juice and sugar, or with spirit of vitriol, or of sulphur per campanam, or of salt, or dulcified

cified spirit of nitre, sweetened with syrup of lemon juice or currant jelly, or a little cinnamon water. But there were many of them who would not drink it, and preferred water alone, if it was sweet, and said, that the acids increased the heat in their præcordia, complaining, though they were not very sour, that they burned their inside. As the disorder continued, the heat naturally diminished in some on the second, in others on the third day, and the pulse returned to its natural state on a sudden. By little and little it became low, and then tremulous. Some of them had petechiæ about their breasts, their arms, and the inside of their thighs. I saw upon some of them several great livid spots. All this together weakened them so much, that on the least motion they fainted away. They had a violent sweat all over, they were uneasy, restless, slightly delirious, very inattentive, caring for nothing, and complaining of nothing, but answering every question almost always very pertinently. Some of them, upon the sinking of the pulse, felt a violent heat about their

their præcordia ; their lips swelled lightly, their face grew ghastly soon after, they vomited a black matter, and then died. Some had the heat and gripings, and voided by stool some black stinking corrupted blood. In some of them on the second, in others on the third or fourth day, the eyes and skin began to grow yellow, which was a bad symptom. Besides this, their tongue grew whiter every day, and at last became tremulous ; all this time they constantly lay upon their backs. As the disorder increased, some on the second or third, or at latest on the fourth day, died very calmly. Those whom at the beginning I bled once or twice, had their pulse lessened very speedily : nay, often after the second bleeding it fell almost immediately, and they were like the first mentioned sick ; but they did not seem to be in so much danger, for there were very seldom any peticulæ visible upon them, nor did they die so soon as the others. The blood which was taken away in the heat of the fever was very red, concreted, and separated a yellow serum

as in *Europe*. Those who stood their ground against this disorder, and lived to the fifth or seventh day, had boils and small red pimples all over their body, which were very painful, and supplicated with great difficulty. Their whole body was covered with them, in a manner very like the confluent small pox ; this was the case in a gentleman, whom it was impossible to see without compassion. It was particularly observed in people of a bilious habit of body, and all who had these symptoms, and lived to the seventh day, recovered, except one who died on the eighth. At length the greatest part, particularly those who were above thirty years old, and who had a bad habit of body, when they were seized with the disorder, complained of a pain and heat about their præcordia, with retchings, but few of them vomited ; the pulse in some of them increased for some hours, but in a short time it returned to its natural state, and then became low. The heat of the skin was natural, the tongue moist and white ; they had a profuse

fuse sweat the first day, but no spots. Those who had little or no sweats were troubled with frequent black and foetid stools and gripings, and frequently fainted away. If these evacuations ceased a little, or diminished considerably, and they did not sweat any more, the patients were then very restless and uneasy. If they sweated profusely, they were better. None of them could sleep from first to last. From these last I took little or no blood, unless for experiment sake, and then it was black, and dissolved, and stood a long time before it coagulated, and never formed a coagulum, which swam in the serum as in the first; it did however coagulate in some measure, but separated little or no serum, and that was very sweet. Their urine was such as I have described already in those who had the *Synochus putris* of the second and third class. Besides this, I observed, that young robust men, particularly those of a bilious habit of body, were not only most liable to these disorders, and suffered most severely from them, but likewise died sooner than

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the others. I shall instance two cases of this sort. A very worthy young man about eighteen years old, beloved by every one in the ship, who found himself very well in the morning, complained about ten o'clock in the forenoon of a pain in his head, and other feverish symptoms; his pulse was large, full and quick. I persuaded him to be blooded, but he would not, saying, that he had been troubled with an epilepsy some years before, and on that account had been forbidden venesection. I endeavoured to persuade him to the contrary, but nothing could induce him to change his opinion. I used every method in the mean time, which I thought would stop the rapid motion of the blood, and preserve the fluids from putrefaction, but all remedies were in vain. The second day at evening he vomited very plentifully some black blood, and died on the third. Another about sixteen years old, named *Evert Krym*, was very well over night, but was found in his bed the next morning totally void of sense. I examined his body, which

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was swelled, and covered with livid spots, he had little or no pulse ; there was some very black blood, which issued from his left ear and nostrils, of a sweet taste, and continued to ooze out some hours after his death. His body in a short time was livid all over and very offensive. By this, and such like instances, I discovered, that although I had been afraid to open a vein in these cases, yet, that it was serviceable to those who had a strong pulse, and a great heat. Though the pulse very soon subsided by those methods, yet by stopping the rapid motion of the fluids, there was more time allowed to treat the disorder properly, which, if there had been an opportunity of doing in the two cases abovementioned, the disorder perhaps would not so quickly have risen to such a height. I could mention here some other symptoms of less importance, but I think these sufficient for the knowledge of the disorder ; on which subject, see Dr. *Monchi's* observations in the *Harlem Transactions*. I opened some of the bodies, and found

found the liver and spleen of a greyish colour, and the gall-bladder and intestines filled with a very black liquor. The heart was of a greyish colour, and when opened there issued out some very black blood. Besides this, at the bottom of the right ventricle, I found some black concreted blood, the thickness of a straw twisted irregularly, and easily dissolvable: in the left, I found the same appearance, but in less quantity. I found the liver quite yellow, as if it had been boiled, and almost entirely destitute of blood.

6. But the cure of these disorders is very similar to that, which I prescribed in the *Synochus putris*, to the sick of the second and third class. At first, in the fevers I gave a vomit, unless the heat was very great; but if it was very violent, some hours before the vomit, I always opened a vein in the arm; after they had vomited, if the heat still continued, I bled them a second time; if the vomit did not promote a stool, and the strength allowed of it, I evacuated the intestines

testines on the following day, by a gentle loosening medicine, and advised them to drink cool acid antiseptic liquors plentifully, if they were fond of them. I ordered them to take frequently some grains of camphire, with simple oxymel and nitre in the form of a linctus. But if they did not like acid liquors, I gave them as much water as they would drink, with a little Glauber's salt, or nitre. When the heat was quite removed, I had recourse to Peruvian bark, as a sure refuge, and found it was extremely useful when given in decoction, if taken in a sufficient quantity. I added to it either some sal polycrest, prunella, Glauber's, or some nitre; nay, if there was occasion, some cortex simarubæ. By this excellent remedy the looseness was generally, and the colliquative sweats always, removed, though sometimes slowly, and the spirits and strength of the sick surprizingly recovered. But when they were able to walk about again, instead of bark, I gave them occasionally, in the day, a cup of bitter infusion; and thus, many

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of them were restored to perfect health. Those whose pulse increased very little or not at all, and whose heat was not more than natural, I did not bleed, but gave them a vomit immediately, and treated them in other respects as abovementioned, unless, that where there was a very great loss of strength, I ordered applications of vinegar, camphire and Venice treacle, to be laid on the abdomen, the wrists, the palms of the hands, and the soles of the feet. If I suspected a delirium coming on, I ordered blisters on the arms, the thighs, the legs, or between the shoulders. Whatever relates farther to this disorder, may be found in the description of the Synochus. Those who were troubled with cholera, I gave the abovementioned drinks in great quantities : this, and applications laid on the epigastric region, were fully sufficient for the first indication. If the very violent motion continued, it was very often quieted by a grain or two of opium. Those who were troubled with a dysentery, were restored by the above-mentioned

mentioned remedies ; namely, by acid liquors, chiefly mineral, Peruvian bark with simaruba, antiseptic applications frequently laid on the abdomen, one or two grains of opium, or a dose of diacordium given in the evening. By this easy and simple method of cure, I was so successful, that when I laid aside those groundless fears which I formed at first, with respect to venesection increasing the putrefaction in these disorders, not one more died in the ship. It remains now, that I should mention a few circumstances, besides those which I have already taken notice of, §.

*9. part 1. cap. 1,* with respect to the provisions which are generally given to the sick on board of ship. For if ever improper food can be detrimental in a sickness, it must be in these disorders ; and therefore the person who has the charge of them should be very careful, that the provision be not fat and rancid. But if he finds it such, he should make it his business to acquaint the commanding officer with it, though that perhaps may be a disagreeable

ble office, and ask for some of another kind for the sick ; nor should he imagine that to be the best, which is prepared of flesh and fat ; as it would be better, if their food was made up of barley, oats, rice or bread, with wine or beer, and sugar, as they are less liable to putrefaction. But in order that the surgeon may discharge his office properly, it would be necessary for him and the officers to know what is proper for the sick, and then he would not err against what is prescribed in these cases : it would be proper likewise, that an inspection of the provisions should be made by an officer, together with the surgeon, that so troublesome a task may not be left to him alone who has no authority ; by which means those, whose province it is, would be more exact in the execution of their office.

P A R T

## P A R T IV.

## *On the Method of Preserving the Health of the Seamen.*

1. I Shall not dwell long on this very useful part, as there has been already so much said upon it by others, that it is very difficult, if not totally impossible, to recollect any thing which has not already been offered to the publick. I chuse therefore to refer my readers to the authors frequently quoted in this work, than take up their time with an useless compilation; besides, I have so frequently in the Preface and the second Part, where I treated of the causes in general, as well as in other parts of this book, mentioned what was prejudicial to the health of the seamen, that the method of correcting and altering those matters for the better, must be obvious to every one who is acquainted with naval affairs, and therefore more need not be said on this subject. On

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this account, to avoid any prolixity, I shall examine four circumstances only, which contribute to the destruction of health, and which are esteemed by all writers on the subject, as the chief causes of disorders on board of ship. In the first place, the provisions should be examined, and if it is necessary, they should be changed. I shall not now dwell on the rules and advice which some very able men in this way have laid down, as well as the method which they propose for pickling the vegetables, in order to preserve them good in very long voyages ; nor shall I enquire into the reasons why their advice is not followed, but shall beg leave to lay down my own precepts, perhaps indeed not better, but somewhat more convenient. Experience assures us, beyond all manner of doubt, that sailors will live three or four months, nay longer, on the usual food on board of ship, without any material detriment to their health ; and that if they eat it too long, and have nothing of any other kind at the same time, that they

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grow thin and pale, and lose their strength. From hence it appears, that such food is unfit for the purposes of nourishment any length of time. But with respect to altering this matter, it cannot much be expected, unless the people in power at the head of the state would take the case into consideration, and settle a plan, that the sailors who stay any time in harbour, or lie in a road, should be allowed their *Poespas*, that is, fresh meat and vegetables boiled together instead of pease, fish, and bacon ; and that if it could be contrived, they should have fresh bread, with some beer, or a small quantity of wine, and the extraordinary expences should be made good to the captains. This would be fully sufficient, and save them the trouble of loading their ships with provisions, which they could not very well find room for. At first, perhaps, this may seem to be too expensive a method ; but if we consider, we shall find that it really is not so. For out of half a pound of meat, with a small quantity of barley or

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rice, such a mess may be made, as is fully sufficient for one man; as for the other things, they are not very dear. The time likewise when this should be done, ought to be considered. If meat is too dear, apples, pears, plumbs and grapes might be boiled, with the barley, as I observed before, §. 19. part 2. cap. 2. sect. 1. with treacle instead of butter, or some lemon and orange juice, and treacle might be put to the boiled barley. For dinner and supper they might have whatever vegetables could be procured, particularly onions, leeks, &c. boiled with their pease. And at the latter end of the boiling, in the presence of an officer, some butter and salt, and if agreeable, some vinegar might be added. This might likewise be done at sea, without the vegetables, and would be particularly useful in warm climates; for if the butter is grown very rancid, the vinegar in some measure corrects it. They might eat this kind of sauce with a little mustard with their fish, and the sailors may thus get rid of

of the trouble of keeping their own butter, which there is scarcely occasion for. Since it would be better, if the captain would order a certain quantity of butter to be mixed in the coppers, and distributed to each man, than that the whole crew should be troubled with keeping it every one for himself: by which means another advantage would arise, namely, their having more room in their chests, and their being kept sweeter and cleaner. The men by living thus in harbour might refresh themselves in such a manner, that they would be able to live many months at sea on the customary food, without greatly injuring their strength or health. With respect to the possibility of getting at these things, I believe there is scarce any harbour, where some of them cannot be procured. But if this method does not please, care should be taken not to suffer the sailors to run in debt at sea, or spend in drink the money which they receive of the purser. How this is to be done is well known to the officers, and they

they may hinder it if they please. The sailors then would be obliged to buy fresh bread and vegetables, nor would a little wine hurt them. The officers in the mean time might take care, that the proper provisions be brought on board, and fix a price upon them, that the sailors might not be imposed upon. For experience tells us, that by these methods, sailors avoid many disorders, which are owing to the want of fresh vegetables ; from whence it may be inferred, that this diet would act as a preservative, where the body was not already much affected. I have already mentioned in the second Part, how stinking water may be sweetened ; namely, by a large aperture in the cask, or by taking off the head of the cask ; by which method it is exposed to the open air. But this is done still more speedily by stirring it sometimes with a stick, or by using a pair of bellows, with a long tube, and blowing into it, and then it will pretty quickly lose its foetid quality. The ships which go to the East Indies should always

ways carry a great quantity of water; where it is to be placed, the officers can best tell, who know how much can be stowed in a ship. But this I am certain of, that although a ship be full, they may, if they please, take in a deal more than is commonly done.

2. Care should be taken, that the air, which is too damp and rarefied between decks, be renewed; if this cannot be done, as is the case by night, or during a storm, when every place is shut up, it may be obtained by a method described by Dr. Du Hamel de Monchy, in a little treatise. This may be easily contrived, by fixing a wooden pipe near the mizen mast, and fitting to it the lower part of an air sail described in the above book, *Plate 1. A. B.* and there called *La Manche*; or by means of a ventilator, such as that of Dr. *Hales*, by which the air might be forced into the hold, and into all the cells or recesses of the ship, but taking care at the same time, that whilst this is doing, all the apertures of the first deck,

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as well as the small gratings in the sides, and the communication between the hold and the kitchen, should be kept shut very close. The air being thus brought into the hold, would insinuate itself into all this large space, finding no way out excepting in the sides of the ship. It would be forced to enter the spaces lying thereabouts, and would communicate itself to the quarter which the sailors sleep in, through the apertures between decks, called *Wegeringen*, and would force out the rarefied air between decks, from the sides to the middle of the ship towards the hatchways. This slow and equal motion coming in every way, and directing itself to the middle of the ship, and forcing out the too rarefied air, cannot be of any disservice to those who are sleeping. It may be remarked, that the effect will be much greater, if the narrow spaces near the second deck are so intercepted as, that the air which is forced out, should only find a passage between decks. But if there is only a necessity for purifying the

the air contained in the hold, and that in the day time ; then some of the boards of the decks at the greatest distance from the tube may be opened, that there may be a longer passage for the air before it goes off. I think this method of changing the air preferable to Mr. *Sutton's* ingenious machine ; for, besides the effect being greater, and the possibility of applying it at all times, and driving out the foul air (which *Sutton's* machine cannot do, as it draws the incumbent atmosphere very slowly down below deck, by which means the exhalations from below are stopped or retarded in going off, for the air cannot find a passage both ways) it has a power of filling the ship by the help of a ventilator, with aromatic fumigations, which *Sutton's* cannot do, by which the air in the ship is very much purified ; besides, when it is most wanted, there are no fires on board, at least I may say not in our ships. But if the reader wishes to know more of these matters, he may consult the authors on the subject, and particularly

the book quoted above, and *Sutton's* new method for extracting the foul air out of ships, a book very much recommended by Dr. *Mead*.

3. A way should be found out of cloathing the sailors properly, and keeping them always clean. The first circumstance may be completed by taking care, that they are provided with necessaries for their voyage before they set out. The number of these should be calculated according to the length of the voyage. For instance, let each man have a woollen jacket, two linen shirts, two other shirts very large, made of a coarse cloth, two waistcoats, three neck-cloths, one woollen pair of breeches, two pair of linen, two pair of drawers, two large pair of sailors trowsers made of the coarsest cloth, three pair of hose, two pair of shoes, two night caps, two sailors hats, three handkerchiefs, one small and large tooth comb, a hammock with a flock tick, a bolster and a blanket. The officer who sees into these matters, when the sailors come on board should take care,  
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that they are all good and in proper order, and when he has examined them, see if his men are properly cloathed. In summer they should have on a shirt, linen waist-coats, a pair of breeches, and a pair of trowsers, a neck-cloth, stockings, shoes and hat. When thus cloathed, the officer should give them as many of their things as they may want to change, when those are washing. They should likewise keep a pound or two of tobacco, if they have any, and their combs ; all the rest of the things should be tied together, and the sailors name be marked on the bundle, to be put into a chest, which should be stowed into the hold, and lie there till the officers shall please to examine the sailors and their effects. Then if it appears, that any of their cloaths are worn out, care should be taken to give them new ones from their bundle, or if the weather is cold, to give them warmer cloathing. If their bundle does not hold out, recourse should be had to the purser, and if they should have any woollen cloaths given them, the linen one,

one, if good, must be returned to the bundle. The sailors likewise should be acquainted, that as often as the captain or officers chuse to examine the things, they should be immediately brought into a place appointed for that purpose, tied up as above mentioned, that they may be able to see the things at one view, and that if they are careless about them, they shall be punished. By these means the sailors not only have proper cloathing, but have an opportunity of changing their things and washing their linen, and keeping themselves clean, which is not the case now with one half of them. Besides, these things take up so little room, that one chest of moderate size is sufficient to hold necessaries for ten men ; by which means there would be only one chest instead of three or four standing between the guns, which might serve as a table for the sailors. Besides, if this were to take place, it would be convenient in many other respects. First, the ship might be cleaned more easily. Secondly, the quantity

tity of air between decks would be greatly increased. Thirdly, there would be no occasion, in case of an engagement, to carry the chests below. Fourthly, it would hinder the women, when they come to take leave of their husbands, from carrying away any of these necessaries, for he that has nought, cannot give, and also prevent their selling their things, and their negligence about them. In order to keep them cleanly, the plan of *Du Hamel de Monceau* should be pursued, who proposes, that there should be a petty officer set over such a number or mess of men; that it should be his province to take care, that not only the space which he presides over should be kept clean, but also to inspect the sailors under his charge, whether they are clean, and properly cloathed; and whether they do their respective duties, and that if any one of the sailors belonging to his department, should be found by the captain or superior officers, defective in any of those particulars, the petty officer should be liable to be punished as

F f well

well as the sailor. By this method the sailors would be kept clean, and the little places built between decks for the use of the inferior officers would be destroyed, and many inconveniences along with them.

4. Lastly, the spaces in the sides between decks should be large enough to hang all the hammocks properly; so that when the ship weighed anchor, and went to sea, half the sailors and marines hammocks should be well fastened together, so that nothing belonging to their bedding should be lost, and put below in the cable-tier, till such time as the ship came back into port, and the watch was again altered. *Vide Preface.* Then their hammocks should be returned to them, as well as to those who fell ill at sea. For half the sailors are obliged to keep watch, so that one hammock is enough for two men, one of the starboard, and another of the larboard watch. By these means the quantity of air and space between decks would be greatly increased. Thus much

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much may suffice on this subject; and I hope what has been offered will be received by the publick with the same sentiments which induced the writer to publish it, who will feel the highest satisfaction, if society reaps any benefit from his labours.

F I N I S.

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